

**Multisectoral approaches to addressing  
malnutrition in Bangladesh:  
The role of agriculture and microcredit**

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## Abbreviations and acronyms

AVRDC	Asian Vegetable Research and Development Centre
BADC	Bangladesh Agricultural Development Corporation
BARI	Bangladesh Agricultural Research Institute
BINP	Bangladesh Integrated Nutrition Project
BRAC	Bangladesh Rural Advancement Committee
BRDB	Bangladesh Rural Development Board
CDD	Community-driven development
CNC	Community Nutrition Centre
CNP	Community Nutrition Promoter
DAE	Department of Agricultural Extension
FAO	Food and Agriculture Organisation
FFS	Farmer Field Schools
GDP	Gross Domestic Product
GNESP	Gardening and Nutrition Education Surveillance Project
GOB	Government of Bangladesh
Ha	Hectare
HFS	Household Food Security
HKI	Helen Keller International
HNPSP	Health, Nutrition and Population Sector Programme
IGVGD	Income Generation for Vulnerable Groups Development
IHNDP	Integrated Horticulture and Nutrition Development Programme
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MFI	Microfinance institution
MOFL	Ministry of Fisheries and Livestock
MOHFW	Ministry of Health and Family Welfare
NARS	National Agricultural Research System
NGNESP	NGO Gardening and Nutrition Education Surveillance Project
NGO	non-government organisation
NNP	National Nutrition Project
PRA	Participatory rural appraisals
PRSP	Poverty Reduction Strategy Paper
RMP	Rural Maintenance Programme
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WFP	World Food Programme

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## Glossary

Anaemia		Low level of hemoglobin in the blood, as evidenced by a reduced quality or quantity of red blood cells; 50 percent of anemia worldwide is caused by iron deficiency.
Body mass index (BMI)		Body weight in kilograms divided by height in meters squared ( $\text{kg}/\text{m}^2$ ). This is used as an index of “fatness” among adults. Both high BMI (overweight, BMI greater than 25) and low BMI (thinness, BMI less than 18.5) are considered inadequate.
Homestead gardens		Range of locations from the edges of fields and backyards to small patches of available land, rooftops, tabletops and the roadside. They are generally close to the house and sources of water, and are managed by family members using low-cost inputs. Produce includes fruits, vegetables, herbs and occasionally, secondary staples such as legumes and sweet potatoes. Household consumption is the primary objective.
Low birthweight		Birthweight less than 2,500 grams.
Malnutrition		Various forms of poor nutrition caused by a complex array of factors including dietary inadequacy, infections, and sociocultural factors. Both underweight or stunting and overweight are forms of malnutrition.
Obesity		Excessive body fat content; commonly measured by BMI. The international reference for classifying an individual as obese is a BMI greater than 30.
Overweight		<p>Excess weight relative to height; commonly measured by BMI among adults (see above). The international reference is as follows:</p> <ul style="list-style-type: none"> <li>• 25–29.99 for grade I (overweight )</li> <li>• 30–39.99 for grade II (obese)</li> <li>• &gt; 40 for grade III.</li> </ul> <p>For children, overweight is measured as weight-for-height z-scores of more than 2SD above the international reference.</p>
Stunting (measured by height-for-age)	as	Failure to reach linear growth potential because of inadequate nutrition or poor health. Measured as height-for-age z-scores that are more than 2SD below the median value of the reference group. Usually a good indicator of long-term undernutrition among young children.
Undernutrition		Poor nutrition: It may occur in association with infection. Three most commonly used indexes for child undernutrition are length-for-age, weight-for-age, and weight-for-height. For adults, undernutrition is measured by a BMI less than 18.5.
Underweight		Low weight-for-age; measured as weight-for-age z-scores that are more than 2SD below the median value of the reference group. It implies stunting or wasting and is an indicator of undernutrition.
Vitamin deficiency	A	Tissue concentrations of vitamin A low enough to have adverse health consequences such as increased morbidity and mortality, poor reproductive health, and slowed growth and development, even if there is no clinical deficiency.
Wasting (measured by weight-for-height)		Weight divided by height that is two z-scores below the international reference. It describes a recent or current severe process leading to significant weight loss, usually a consequence of acute starvation or severe disease. Commonly used as an indicator of undernutrition among children, especially useful in emergency situations such as famine.
z-score		The deviation of an individual’s value from the median value of a reference population, divided by the standard deviation of the reference population.

## **Executive Summary**

Bangladesh faces an unfinished agenda with regard to nutrition. Child undernutrition rates remain among the highest in the world. Infant stunting and underweight rates in Bangladesh are above those in Sub-Saharan Africa (50% vs. 30% for underweight and 50% vs. 40% for stunting) despite the latter's higher poverty rates. A key underlying factor, maternal malnutrition remains intractable despite efforts to improve the nutritional status of pregnant women. Iron deficiency anaemia affects nearly 50% of all pregnant and lactating women. A direct consequence of this is low birthweight, which affects 30-50% of all newborns. It limits children's growth potential and increases their vulnerability to infectious diseases and non-communicable diseases later in life. It also damages their ability to learn and develop useful skills, which exposes them to poverty and further undernutrition. Bangladesh is thus characterised by a cycle of intergenerational poverty, ill-health and malnutrition.

To-date, public sector investments to address this have had very little impact because they were limited in scale and scope. Malnutrition is a multi-dimensional problem requiring interventions that cut across sectoral boundaries. Sustained improvements in nutrition outcomes are achieved not only through improved food security, but also changes in behaviours and knowledge regarding dietary diversity, child care and health care. Such changes require broader interventions that cut across multiple sectors such as food and agriculture, water and sanitation, education and health. In Bangladesh, malnutrition has largely been viewed as a health issue, with interventions to address malnutrition channelled almost exclusively through the health sector. Such interventions have failed to deliver a coordinated solution to address the multidimensional causes of malnutrition.

The objective of this study is to demonstrate how the interaction between sectors can be improved to increase the effectiveness of sectoral interventions. It looks beyond the health sector to other sectors, which could have a large impact on nutrition, but whose potential has not been fully exploited yet in Bangladesh. In particular, it looks at how interventions in the agricultural sector and microfinance can be used to improve nutritional outcomes.

The study examines evidence from Bangladesh and elsewhere in the world to assess the impact of existing interventions and come up with recommendations for future action. The study will also pay special attention to the extent to which programmes and policies are successful at reaching poor and vulnerable groups in society and thus, reduce inequalities in nutrition.

### ***Pathways of influence between agriculture and nutrition***

Interventions in the agriculture sector can potentially influence all of the three underlying determinants of malnutrition: food intake, caring practices and healthy environment. Agriculture affects food intake through the food production-consumption pathway, mediated by increases in incomes and reductions in price. Higher incomes also improve living conditions in general and increase access to health care. However, increased food consumption does not always translate into improvements in nutrition, and may simply lead to the consumption of more food, or more expensive food. Plus, intra-household resource allocation mechanisms may be such that the most nutritionally vulnerable members of the household do not gain from the greater availability of food. Increased empowerment of women resulting from efforts to give women more control over agricultural resources improves nutrition, especially because it helps improve the intra-household

distribution of both food and care. Finally, agricultural growth can lead to broad improvements in nutrition outcomes through its impact on overall macroeconomic growth.

### ***Impact of agricultural interventions on nutrition***

While national food security has improved in recent years in Bangladesh, thanks to increases in the production of staple foods, household food security has not been achieved for a large proportion of the population. With limited land and labour entitlements to help improve access food, *transitory* food insecurity is a major problem for the poor, particularly in the aftermath of natural disasters. For households below the poverty line, *chronic* food insecurity is also a problem. Household survey data indicate that annual household expenditures per capita for these households are inadequate to purchase sufficient calories.

Improvements in nutrition outcomes require not only food security, but also dietary diversity and better health and nutrition behaviours. Dietary diversity has decreased over the years for the poor in Bangladesh. The growth in cultivation of staple crops marginalised the land available for the production of key non-staples such as pulses and oilseeds. As a consequence, these protein-rich foods have become relatively scarce and their prices have risen. The production of fruit and vegetables has not increased either. Both these factors partly explain why dietary diversity has shown little improvement, particularly for the poor.

In Bangladesh and elsewhere, interventions to encourage the production of fruits, vegetables and animal source foods have proved to be effective in improving household food security and dietary diversity only when they are combined with efforts to empower women and nutrition education.

Technological interventions in agriculture around the world have had an important role to play in improving nutrition. The introduction of modern agricultural technological inputs and improved crop varieties for staple crops, plant breeding to improve the adaptability of fruit and vegetable crops, and improvements in storage and transportation of perishable foods have all contributed to better food security and greater access to a more diversified range of foods for a larger population at lower prices. Investments into the research and dissemination of agricultural technologies are critical for improving nutrition through the agriculture sector. Current research into improved crops, plant breeding and post-harvest technologies in Bangladesh is not sufficient and the resources and capacity for doing this type of research needs to be strengthened considerably.

Integrating nutrition into community-driven development (CDD) programmes in the agriculture sector may hold potential for mobilising the agriculture sector to improve nutrition. A CDD approach to improving nutrition through the agriculture sector would take into account the community's own assessment of its agro-economic constraints, food security situation, and health and nutrition needs. A major risk in taking a CDD approach to designing nutrition programmes is that communities may not necessarily invest in nutrition interventions since malnutrition is not a very visible problem. It may be necessary to introduce some form of conditionality to invest in nutrition if a CDD approach is taken. There are no known examples of CDD approaches that have led to substantial investments in nutrition and consequently, to improvements in nutrition outcomes.

Two emerging trends pose new challenges for the relationship between agriculture and nutrition. Given the double burden of malnutrition associated with under- and over-nutrition in most developing countries today, the agriculture sector must not only ensure sufficient supplies of staples and micronutrient-rich foods to combat undernutrition, it also needs to discourage over-



consumption of nutrient-poor, energy dense foods to combat overnutrition. The view that agriculture's role in Bangladesh is to ensure food security by providing as cheap a source of abundant calories as possible is not conducive to addressing the twin problems of malnutrition. Secondly, the high degree of market orientation of agriculture means that agricultural markets, in addition to production, play a crucial role in determining food availability and access today. To increase consumption of micronutrient-rich fruits and vegetables the market supply chain needs to be adapted and strengthened to make fresh produce more affordable to households, as well as increase producers' access to markets.

### ***Pathways of influence between microcredit and nutrition***

Three potential pathways of influence between microcredit and nutrition exist: the direct income effect, where greater access to credit is associated with higher incomes and reduced economic vulnerability, which translates into greater household food security; the women's empowerment effect, where greater access to credit for women is associated with a greater share of household resources being devoted to food and nutrition, and improved intra-household allocation of resources; and the direct effect of health and nutrition services provided in conjunction with microcredit.

### ***Impact of microcredit programmes on nutrition***

Both in Bangladesh and elsewhere, the evidence with regard to the impact of access to credit on incomes is ambiguous. It is clear, however, that access to microcredit has significantly reduced consumption vulnerability and potentially, food insecurity. This is a particularly important effect in the context of Bangladesh where transitory food insecurity during periods of scarcity is an important underlying cause of malnutrition.

Microcredit has had a positive impact on women's empowerment in Bangladesh by improving their income generating potential and as a result, their status within the household and community. Women's borrowing has been found to have a significantly greater positive impact on child nutrition than men's borrowing. This is attributable in part to women being empowered enough to have a greater say over household resource allocation decisions with regard to food and care for children, and the fact that women are more likely than men to allocate more resources to children.

Strong rationale exists for providing nutrition and health services in conjunction with credit because improvements in income alone, although sufficient for improving food security are not sufficient to improve nutrition itself. However, the evidence with regard to the effectiveness of these integrated programmes is not compelling. Since there are large interdependencies between the credit-led income effects and the health/nutrition education effects, it is possible that the two effects are mediated by one another. Given the lack of evidence, it would not be advisable to do away with the health/nutrition education components because of the potentially important role they play in communicating behaviour change messages to credit group members, who are poor, nutritionally vulnerable and important agents of change in the household and community.

### ***Challenges to improving nutrition through interventions in agriculture and microcredit programmes***

Given the potentially important role of nutrition education in agricultural interventions and microcredit programmes in improving nutrition outcomes, it is necessary to examine the most

effective mechanism for delivering it. In the case of microcredit, existing programmes largely involve the microfinance institution (MFI) taking responsibility for the provision of both credit and health/nutrition programmes. While this may be feasible for large MFIs with a diversified portfolio, in most cases, the integrated provision may undermine the efficiency with which microcredit services are provided. In the case of agriculture, nutrition education often ends up being the responsibility of the agriculture sector, where staffs have neither the skills nor experience to design and implement this. MFI's and agricultural agencies do not have much comparative advantage in providing nutrition services. A more efficient, but less well explored approach is for the MFI or agriculture agencies to establish strong linkages with existing health and nutrition service providers.

Similarly, efforts to empower women through agriculture or microcredit can enhance the impact on nutrition. However, it is equally important to consider women's roles and constraints, and the cultural context when designing interventions. In general, women face unequal rights relative to men in terms of access to household resources, and greater institutional biases against them than men in access to training and new technological inputs. Failure to understand cultural norms and the gender dynamics in the household have generally resulted in less than optimal outcomes, both for women's empowerment and nutrition.

The poorest of the poor gain little from interventions in the agriculture sector or microcredit programmes. The underlying determinants of malnutrition are highly correlated with poverty, making the poor the most vulnerable to malnutrition in Bangladesh and elsewhere. Their land and capital entitlements are virtually non-existent and labour entitlements not substantial enough to guarantee a regular source of income. This combined with a high perceived risk of failure in repaying the loans excludes these groups from most microcredit programmes. In Bangladesh in particular, the poorest of the poor include large numbers of landless households.

Numerous, small-scale interventions exist that provide agriculture or microcredit services in conjunction with nutrition components and are associated with improvements in nutrition outcomes; but attempts to scale up these programmes have met with limited success. The household food security programme in Bangladesh is a good example of a successful small-scale intervention that failed to have much impact when it was scaled up to the national level. Underlying causes for failure of scaling up in general include weak capacity for monitoring and evaluating (M&E) the interventions, not taking into account local needs and conditions, and larger institutional problems of cross-sectoral coordination.

### ***Multisectoral response to malnutrition***

Coordinated, multisectoral programmes to address malnutrition have proved largely unsuccessful. Policy responses to malnutrition should therefore not be held hostage to the success or failure of intersectoral coordination mechanisms. A more realistic response is to 'plan multisectorally, implement sectorally'<sup>1</sup>. Operationally, this involves identifying interventions within sectors that have the potential to significantly improve nutrition and mobilising resources specific to that sector. Two factors are critical for this strategy to work. First, it is necessary to ensure that sector-specific stakeholders understand how their sector can contribute to alleviating malnutrition and to what extent the benefits outweigh any opportunity costs they face by committing sector-specific resources to nutrition. Second, it is necessary to ensure that alleviating undernutrition remains a high level policy priority for the government.

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<sup>1</sup> **Maxwell, S&T., C.,** "New Approaches to Planning," *Operations Evaluation Department Working Paper Series*. Washington D.C.: The World Bank, 2000.

### ***Key recommendations***

- (1) Policy responses to malnutrition should not be dependent on intersectoral coordination.
- (2) A more realistic response is to ‘plan multisectorally, implement sectorally’
- (3) It is not feasible or cost-effective to incorporate nutrition components into all agricultural or microcredit programmes. Some agricultural and microcredit programmes are more suitable for integrating nutrition components than others.
- (4) In agriculture, the greatest potential for improving outcomes by integrating nutrition lies in the production of fruit, vegetables, livestock and aquaculture, particularly small-scale production at the household level.
- (5) In microcredit, the greatest potential for improving outcomes by integrating nutrition lies in targeting microcredit programmes that women are most likely to be involved in, and where there is a strong income effect.
- (6) Financing and implementing the nutrition component should be the responsibility of the health and nutrition sector, which has comparative advantage in this; the design of agriculture and microcredit programmes should ensure the nutrition components are integrated effectively.
- (7) Empowerment of women should be emphasised in the design of agriculture interventions and microcredit programmes
- (8) Nutrition components of agriculture interventions and microcredit programmes should promote participatory learning to enhance women’s empowerment
- (9) To scale up successful nutrition components in agriculture or microcredit interventions, M&E capacity needs to be strengthened and greater attention paid to local-level needs and conditions
- (10) The institutional capacity of GOB agencies to establish and manage effective M&E systems needs to be strengthened considerably.
- (11) Nutrition interventions should be integrated with combined microcredit and safety net programmes in order to ensure they reach the poorest of the poor

# 1. Introduction

## *1.1 Background and rationale*

Bangladesh faces an unfinished agenda with regard to nutrition. Child undernutrition rates remain among the highest in the world. Infant stunting and underweight rates in Bangladesh are above those in Sub-Saharan Africa (50% vs. 30% for underweight and 50% vs. 40% for stunting) despite the latter's higher poverty rates. A key underlying factor, maternal malnutrition remains intractable despite efforts to improve the nutritional status of pregnant women. Iron deficiency anaemia affects nearly 50% of all pregnant and lactating women. A direct consequence of this is low birthweight, which affects 30-50% of all newborns. It limits children's growth potential and increases their vulnerability to infectious diseases and non-communicable diseases later in life. It also damages their ability to learn and develop useful skills, which exposes them to poverty and further undernutrition. Bangladesh is thus characterised by a cycle of intergenerational poverty, ill-health and malnutrition.

To-date, public sector investments to address malnutrition in Bangladesh have had very little impact because they were limited in scale and scope. The Bangladesh Integrated Nutrition Project (BINP) and its successor, the National Nutrition Project (NNP) represented large-scale policy responses to high rates of malnutrition among women and children in Bangladesh. In 2006, nutrition activities were merged into the Health Nutrition and Population Sector Programme (HNPSP). The scope of the nutrition programmes under BINP, NNP and HNPSP have remained the same throughout, with the emphasis on providing nutritional counselling and growth monitoring. The geographical coverage of these community-based programmes has fallen far short of ever achieving national coverage. Evaluations of BINP and NNP indicate that these programmes have failed to achieve sustained reductions in malnutrition over time (Save the Children, 2003, The World Bank, 2005a).

Undernutrition is a multi-dimensional problem requiring interventions that cut across sectoral boundaries. The three main underlying causes of undernutrition are a lack of food security, poor caring practices, and inadequate access to health care, safe water and sanitation (UNICEF, 1990). Sustained improvements in nutrition outcomes are achieved not only through improved food security, but also changes in behaviours, knowledge and attitudes within the household regarding maternal and child care, appropriate feeding practices and health care. Such changes require broader interventions that cut across multiple sectors such as food and agriculture, water and sanitation, education and health. The potential for improving nutrition through interventions in these sectors has not been fully explored in the context of Bangladesh.

Nutritional interventions in Bangladesh have largely been channelled through the health sector. Programmes such as HNPSP tackle malnutrition by addressing behavioural issues surrounding caring and feeding practices and improving access to health care. The impact of these efforts has already been examined quite extensively in other studies (The World Bank, 2005a, b). Significant investments made in recent decades in two other sectors, education, water and sanitation have also contributed to reducing the burden of malnutrition. Large increases in female schooling rates have been particularly important in reducing undernutrition. These impacts are relatively well understood.

This study looks beyond the health, education, water and sanitation sectors to other sectors, which could have a large impact on nutrition, but whose potential has not been fully exploited yet in

Bangladesh. The focus of this study is on interventions in the agriculture sector and microcredit programmes.

Interventions in the agriculture sector can be used to increase not only the quantity but also the quality and diversity of food available to the population. Bangladesh is a predominantly agrarian economy. About 75% of the population lives in rural areas and their main sources of livelihood are agriculture and the rural non-farm sector (The World Bank, 2005c). Moreover, the country's susceptibility to natural disasters means that there are large fluctuations in the supply and prices of agricultural commodities, with negative implications for poor and nutritionally vulnerable groups. Interventions to achieve sustainable increases in the domestic production of staples, as well as fruit, vegetables and animal source foods therefore have an important role to play in achieving food and nutrition security, both nationally and at the household level. A World Bank report, *From Agriculture to Nutrition: Pathways, Synergies and Outcomes* recently examined the linkages between agriculture and nutrition at the global level and the impact of agriculture interventions (The World Bank, 2007). In this report, we build on the findings of the World Bank study, by focussing on the challenges and opportunities faced by Bangladesh.

Microcredit programmes have played a key role in promoting small scale enterprises and contributed enormously to women's empowerment in Bangladesh. The same mechanism could be used to promote the establishment of household vegetable gardens and poultry farms, which provide an important source of income, particularly for women and help improve the nutritional security of poor households. Given the long experience of implementing successful microcredit programmes in Bangladesh, integrating nutrition with microcredit programmes remains a potentially viable option worth exploring.

The report, *'Repositioning Nutrition as Central to Development: A Strategy for Large-Scale Action'* (World Bank 2006) makes the case that governments and development partners must increase investments in nutrition in developing countries. This is based on the evidence that the scale of the problem is very large and that nutrition interventions are essential for speeding poverty reduction. In fact, they can improve nutrition much faster than can economic growth alone. Improved nutrition in turn, can drive economic growth. The report also emphasises that malnutrition is a multifaceted problem requiring sustained efforts from many sectors. This provides the starting point for this report.

## **1.2 Objectives**

The objective of this study is to demonstrate how the interaction between sectors can be improved to increase the effectiveness of sectoral interventions, and how the interventions in the agricultural sector and microfinance can be used to improve nutritional outcomes.

The study will examine what has been done to improve nutrition through interventions in the agriculture sector and microcredit programmes in Bangladesh and around the world, how they were implemented and to the extent possible, what the impact of those interventions was. The population of primary concern for this study are infants, children and women of childbearing age, the group that is the target of many of the Millennium Development Goals. The study will also pay special attention to the extent to which programmes and policies are successful at reaching poor and vulnerable groups in society and thus, reduce inequalities in nutrition.

The specific objectives are as follows:

1. To review policies and programmes related to agriculture and microcredit that are potentially influential for nutrition
2. To examine the evidence on how these programmes were implemented and where possible, how successful the interventions have been in reducing maternal and child malnutrition.
3. Based on the findings of the review, compare what could be done through interventions in the agriculture sector and microcredit programmes with what is actually being carried out in Bangladesh, to provide recommendations for future action and support from the Government of Bangladesh and the development partners. The focus will be on how the interactions between sectors can be improved to increase the effectiveness of sectoral interventions.

### ***1.3 Study scope and definitions***

The nutrition outcomes considered in this report fall into the following three categories.

- *Household level food consumption*, which includes household consumption of food and food groups, or energy (calories), and household expenditures on food groups.
- *Individual food and nutrient intake*, which includes intakes of macro- and micronutrients, and of foods rich in specific micronutrients such as Vitamin A and iron.
- *Nutritional status*, which includes anthropometric indicators such as height, weight, body-mass index, and micronutrient-specific indicators such as serum retinol (indicator of Vitamin A status), haemoglobin (indicator of iron status)

To the extent possible, the studies that are included for this review were ones that examined the impact of agriculture or microcredit interventions on one of the three nutrition outcomes above.

It is important to note that this study is exploratory in nature and does not attempt to carry out a thorough review of the impact of interventions in the agriculture sector and microcredit programmes on nutrition. Nor does it use primary data to carry out new evaluations of interventions. It is based entirely on secondary data and desk reviews of the published and grey literature.

### ***1.4 Structure of the report***

The Introduction provides the background and rationale for this work. Chapter 2 assesses the status of malnutrition in Bangladesh, provides a brief history of policies and programmes to address malnutrition in the country and lays out the case for a multisectoral response to malnutrition. Chapter 3 reviews the potential role of interventions in the agriculture sector, including existing evidence on the impact of such interventions and institutional and other challenges to enhancing the impact. Chapter 4 provides a similar review of the role of microcredit programmes in improving nutrition outcomes. Recommendations on using multisectoral approaches to improve nutrition in Bangladesh are the subject of Chapter 5.

## 2. Policy and programmatic responses to undernutrition in Bangladesh: why is a multisectoral approach needed?

### 2.1 Levels and trends in malnutrition in Bangladesh

#### Child undernutrition

In 2004, 48 percent of children under five in Bangladesh were underweight, a ‘very high’ level of prevalence by WHO standards (Table 2. 1). The prevalence of stunting among the same age group was also very high at 43 percent. Nearly one-third of all children were born with low birthweight. Among South Asian countries Bangladesh has the highest rates of underweight and low birthweight, both of which are above the South Asian average (Table 2. 2).

**Table 2. 1: Public health significance of undernutrition in Bangladesh**

	<i>WHO classification (prevalence %)</i>			
	Low	Medium	High	Very High
Stunting	<20	20-29	30-39	≥ 40-49
Underweight	<10	10-19	20-29	>30
Wasting	<5	5-9	10-14	>15
<i>Bangladesh (prevalence %)</i>				
Stunting				43
Underweight				47.5
Wasting			13.0	

Source: WHO and Authors’ calculation from Bangladesh DHS 2004

**Table 2. 2: Health and nutrition indicators in South Asia, 2005**

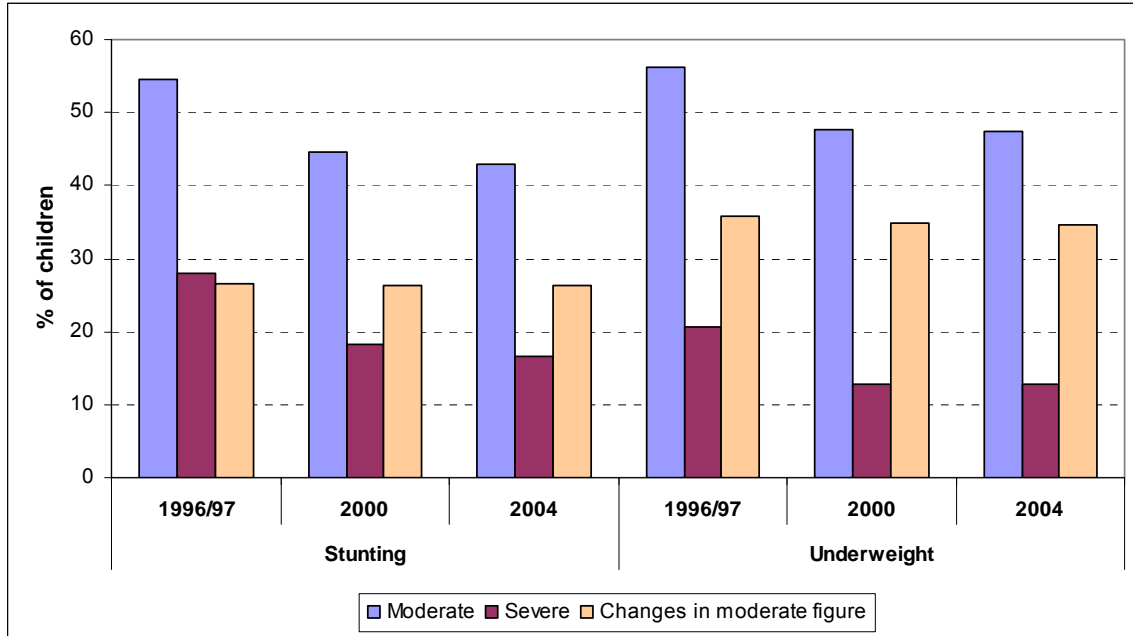
<i>Country</i>	<i>LBW (%)</i>	<i>Underweight (%)</i>	<i>IMR (per 1,000 live births)</i>	<i>GNI per capita (US\$)</i>	<i>Adult literacy (%)</i>
Bangladesh	30	48.5	46	400	40
India	30	46.7	63	540	57
Nepal	21	48.3	61	240	42
Pakistan	25	35.0	74	520	43
Sri Lanka	22	29.4	13	930	92
<b>South Asia</b>	<b>29</b>	<b>48.4</b>	<b>66</b>	<b>510</b>	<b>54</b>

Source: World Bank, 2005b

The prevalence of undernutrition remains high despite substantial declines during the 1990s. For instance, the rate of stunting declined from 64 percent in 1992 to 49 percent in 2000. Much of this decline was due to reductions in severe stunting and severe underweight rates (Figure 2. 1). Severe stunting declined from 28.0 percent in 1996/97 to 16.9 percent in 2004; from ‘medium’ to ‘low’ according to WHO’s classification. The prevalence of severe underweight fell as well, but to a lesser extent by approximately 9 percent. Moderate underweight declined from 20.6 percent in 1996/97 to 12.8 percent in 2004 while stunting fell from 54.6 percent in 1996/97 to 43.0 percent in 2004. However, the prevalence of underweight and stunting appears to be more profound among the poor (Figure 2. 2). Mother’s education has been used as a proxy for poverty

rates as data by wealth quintile are not available. The decline in undernutrition is generally attributed to the reduction in poverty and significant improvements in maternal schooling.

**Figure 2. 1: Prevalence of undernutrition among children under-five, 1996/97, 1999/2000 and 2004**

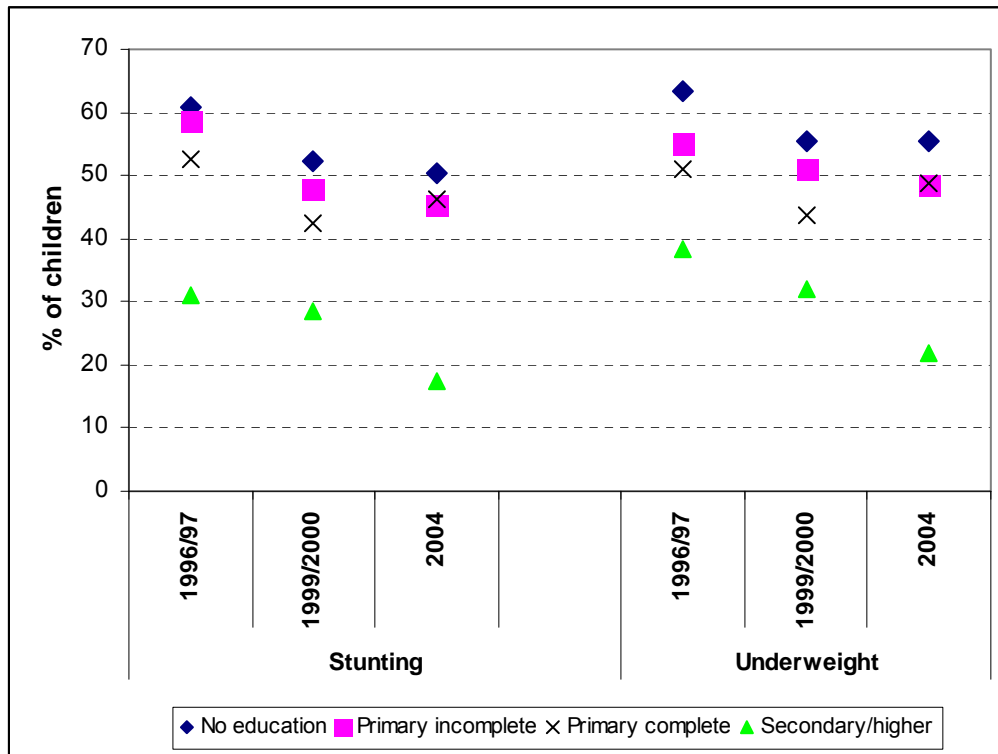


Source: DHS 1996/97, 1999/2000 and 2004

Note: The moderate stunting and underweight rates (blue bars) include the severe stunting and underweight rates. The orange bars show that the real change in moderate stunting and underweight rates has been relatively flat.



**Figure 2. 2: Prevalence of child undernutrition classified by mother's education, 1996/97, 1999/2000 and 2004**



Source: DHS 1996/97, 1999/2000 and 2004

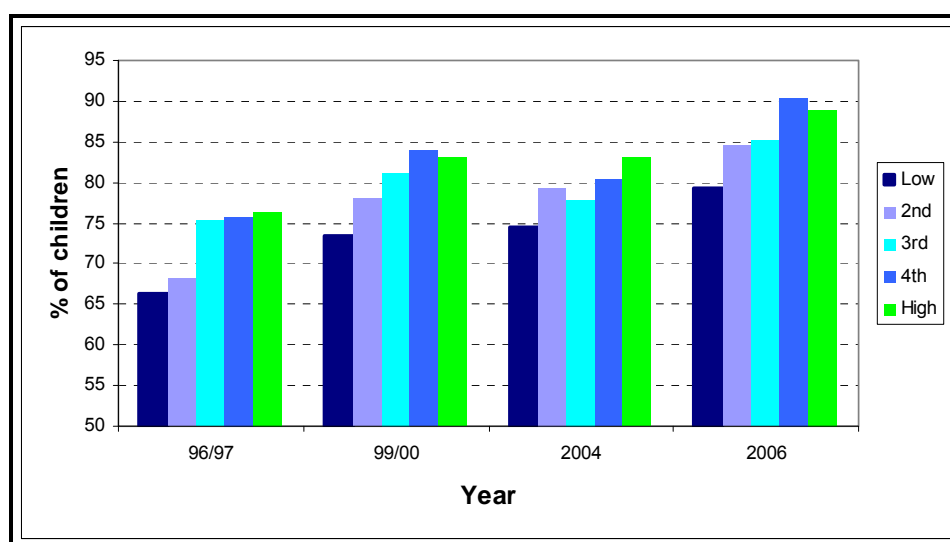
### *Micronutrient deficiencies*

Bangladesh has made considerable progress in keeping Vitamin A deficiencies at a relatively low level. As Table 2. 3 shows, the prevalence of clinical Vitamin A deficiency (VAD) is less than 1 percent, although still higher than the WHO cut-off for severity of clinical VAD prevalence of 0.5 percent. The coverage of the Vitamin A supplementation programme has increased over time and there are few disparities across income groups (Figure 2. 3).

**Table 2. 3: Prevalence of Vitamin A deficiency in South Asia**

	<i>Vitamin A deficiency</i>	
	<i>Children &lt;6 w/ sub clinical VAD (%)</i>	<i>Children &lt;6 w/ clinical VAD (%)</i>
Afghanistan	53	-
Bangladesh	28	0.7
Bhutan	32	0.7
India	57	0.7
Nepal	33	1.0
Pakistan	35	-
Sri Lanka	35	0.8

Source: UNICEF and Micronutrient Initiative 2004.

**Figure 2. 3: Coverage of vitamin A supplementation among children aged 9-59 months by income groups**

Iron deficiency anaemia (IDA) among pregnant women is relatively high in Bangladesh compared to the rest of South Asia (Table 2. 4). Prevalence of IDA among children under-five is low. However, this overall rate masks much higher rates found among very young children. The prevalence of anaemia was 78 percent among children 6-11 months of age and 64 percent among children 12-23 months of age (The World Bank, 2005a) .

**Table 2. 4: Prevalence and trends in iron deficiency anaemia in South-Asia**

	<i>Iron deficiency anaemia</i>		
	<i>Children &lt;5y (%)</i>	<i>Women 15-49y (%)</i>	<i>Pregnant women (%)</i>
Afghanistan	65	61	-
Bangladesh	55	36	74
Bhutan	81	55	68
India	75	51	87
Nepal	65	62	63
Pakistan	56	59	-
Sri Lanka	30	32	30

*Source:* UNICEF and Micronutrient Initiative 2004

In short, the problem of malnutrition in Bangladesh is acute and needs urgent attention. Past and present policy responses to malnutrition in Bangladesh are examined next.

## ***2.2 Evolution of nutrition policies and interventions in Bangladesh***

### *National agencies and policies to address malnutrition*

In one of the earliest attempts by the Government of Bangladesh (GOB) to address malnutrition in a comprehensive manner, the Bangladesh National Nutrition Council (BNNC) was established in 1975 by order of the President. This high level agency was made responsible for the overall coordination of nutrition policy. Its tasks include the formulation of the National Food and Nutrition Policy, approval of nutrition programs for different ministries and institutes, monitoring and evaluation of nutrition programmes and the preparation of a national plan for nutrition. BNNC has not been very effective in mobilising resources to address the malnutrition problem or in coordinating a multisectoral response.

Bangladesh produced a National Plan of Action for Nutrition (NPAN) in 1997, inspired by the International Conference on Nutrition five years earlier. The primary objective of NPAN was to improve the nutritional status of the people of Bangladesh so that malnutrition would no longer be a public health problem by 2010. NPAN has been implemented in a piece-meal manner only over the years and has remained largely ineffective as a result. Other national policy documents that have implications for addressing malnutrition are the Poverty Reduction Strategy Paper (PRSP, 2004) and the National Food Policy (NFP 1988, 2006).

The PRSP is the current overarching public policy for combating poverty in all its dimensions, including malnutrition. It identifies eight specific avenues through which poverty reduction will be achieved. One of these avenues, human development and nutrition is included under “investing in health”. Nutrition has been included in other areas of the PRSP as well.

The National Food Policy (NFP), 2006 is a follow-up to the 1988 one, formulated by the Ministry of Food and Disaster Management. The focus of NFP 1988 was on food availability and overlooked other key facets of food security. The National Food and Nutrition Policy (NFNP), formulated in 1997 by MOHFW attempted to bridge this gap by including food diversification, health and nutrition as key areas of intervention for the national food security system. However, this policy failed to cover two important challenges: the need for ensuring a stable, affordable and

diversified food supply, and the need for increasing the purchasing power of the poor. NFP 2006, which improved on the two earlier policies sets out to achieve the following broad-based goals: adequate and stable supply of safe, nutritious food; increased purchasing power and access to food; and adequate nutrition for all individuals, especially women and children.

### *Policies and interventions to address nutrition in the health sector*

The malnutrition problem in Bangladesh has largely been viewed through the ‘health sector lens’. Direct nutrition interventions have been implemented by the Ministry of Health and Family Welfare (MOHFW), although there is no separate directorate for nutrition in MOHFW. Policy documents which were examined for this report rarely identify nutrition as a specific concern; it is almost always discussed in the context of health sector programs.

The National Health Policy formulated in 2000 aims to reduce the prevalence of malnutrition, especially among the children and mothers, and undertake effective and integrated programs to improve their nutritional status. In addition, the National Strategy for Infant and Young Child Feeding (IYCF) formulated in 2006 aims to improve the nutritional status, growth and development, health and survival of infants and young children in Bangladesh.

The Bangladesh Integrated Nutrition Project (BINP, 1995–2002), with a budget of USD 67 million, was the first national programme of interventions to tackle malnutrition in Bangladesh. The project was implemented in 40 rural upazilas between 1995 and 2000, and was expanded to a further 21 upazilas by 2002. In 2003, BINP was succeeded by the National Nutrition Project (NNP), which expanded coverage to a total of 105 upazilas. NNP was funded under a separate World Bank credit worth USD 124 million. In 2005, NNP was merged into the Health, Nutrition and Population Sector Programme.

The scope of nutrition services provided through BINP, NNP and HNPSP has remained largely the same throughout. The main intervention involves the use of growth monitoring and promotion as tools to educate the mother, and information and counselling to improve caring and feeding behaviours. In addition, iron-folate supplementation is provided to pregnant women, Vitamin A supplementation to post-partum women and food supplementation to severely malnourished and growth-faltering children. Forums are organised for adolescent girls and newly wed women to provide education and counselling in health and nutrition issues. BINP and NNP also included household food security (HFS) interventions, implemented through the Ministries of Agriculture and Fisheries and Livestock and the Vulnerable Group Development (VGD) Program of the Ministry of Women and Children’s Affairs. However, the food security component of NNP was discontinued in December 2005 due to poor performance.

The method of service delivery through area-based community nutrition activities contracted out to NGOs has also remained the same throughout. Community nutrition activities are organised around community-donated Community Nutrition Centres, established for a population of 1,250 to 1,500, and run by part-time female workers, called Community Nutrition Promoters (CNP). CNPs are supervised by Community Nutrition Organisers. In addition, Village, Union and Upazila Nutrition Management Committees are established for community mobilisation and intersectoral coordination. The National Nutrition Programme under MOHFW is responsible for contracting out the services and for monitoring and evaluation.

With financing from HNPSP, the Institute of Public Health Nutrition (IPHN), under the Directorate of Health Services at MOHFW, provides micronutrient supplementation throughout

the country. Other national-level nutrition activities consist of communication support (implemented by UNICEF), breastfeeding promotion and support, (implemented by the Bangladesh Breastfeeding Foundation) and iodine fortification of salt.

### ***2.3 The case for a multisectoral response to malnutrition in Bangladesh***

The PRSP has set out specific targets to be met by 2006 relating to nutrition. The strategies proposed by the PRSP for meeting these targets basically involve continuing with and expanding the current set of nutrition interventions provided through MOHFW. Yet, evaluations of BINP and NNP have shown the impact of these interventions to be ambiguous. This leads to the question of whether current interventions to address malnutrition in Bangladesh are adequate and what more needs to be done so as to achieve substantial reductions in malnutrition. Answering this question requires an understanding of the determinants of malnutrition.

Malnutrition is a complex problem generated by factors operating at several levels and across multiple sectors. The potential causes of malnutrition may be classified as immediate, underlying, and basic. Figure 2. 4 presents a conceptual framework for assessing the causes of child malnutrition, which is adapted from UNICEF and more recent work in this area (P. Engle et al., 1999, L. Haddad et al., 2002). This framework highlights the need to work in multiple sectors in order to address the problem of malnutrition.

Inadequate dietary intake and disease are often the *immediate* causes of malnutrition and directly affect the individual. Moreover, they form a vicious cycle: inadequate dietary intake increases the likelihood of illness because of weakened immune levels; illness leads to a loss of appetite and poor absorption, which in turn, worsen malnutrition.

Lack of household food security, inadequate care for mothers and children, and poor health and environmental conditions are the main *underlying* causes of malnutrition. Each one is determined by the social and economic resources available to the individuals and the household as a whole. Poverty is a key factor affecting all underlying determinants.

Household food security implies that the household in which the child lives has the resources to access a sufficient quantity and quality (energy, protein, and micronutrients) of foods needed to lead a healthy life. Dietary diversity is as critical to good nutrition as food energy availability. The resources needed to achieve food security are food production, income for food purchases, and/or in-kind transfers of food. As explained in Box 2. 1 food security alone does not imply nutrition security.

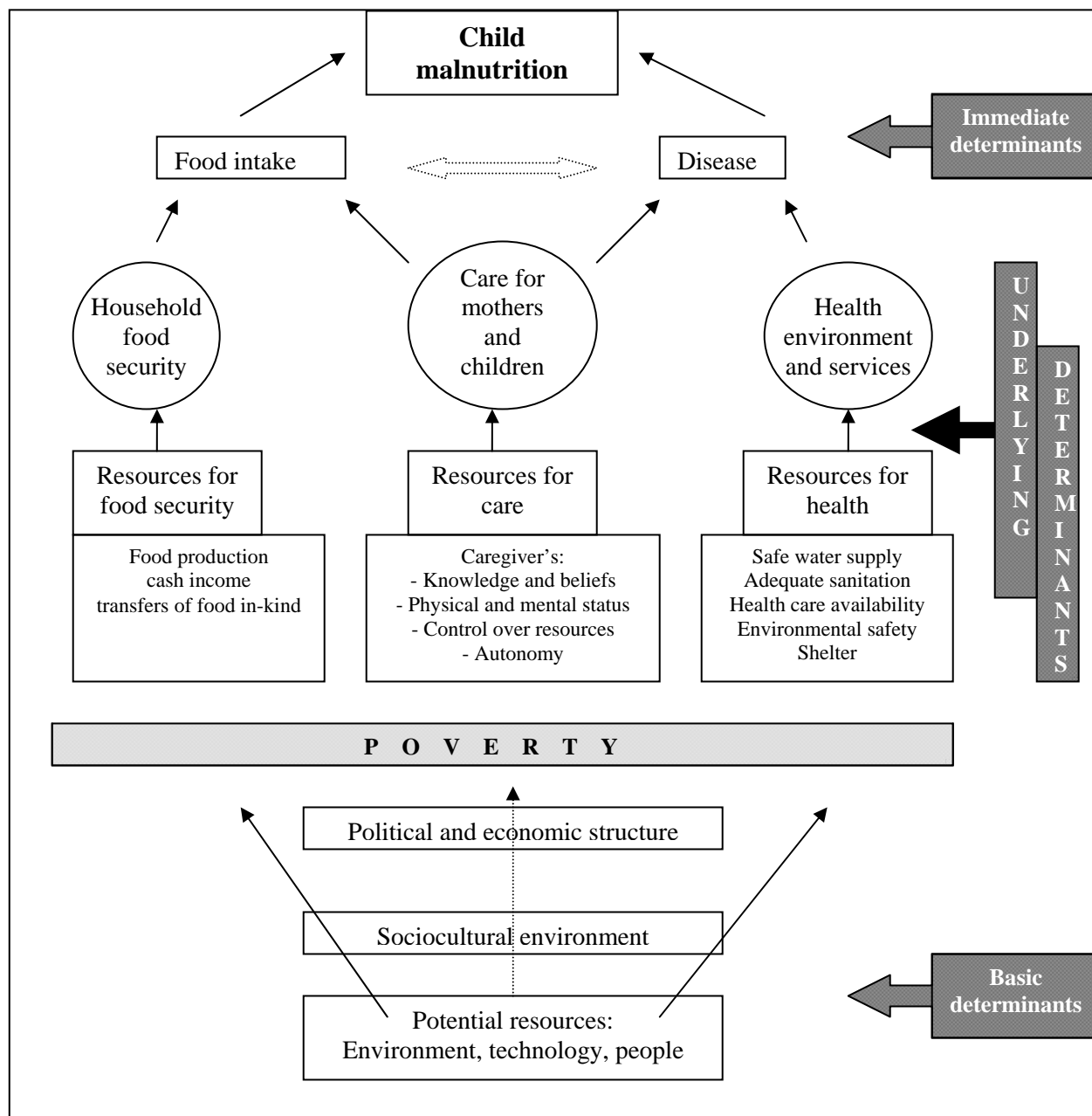
Caring practices include appropriate nutrition and support for mothers during pregnancy and lactation, infant feeding practices (breastfeeding and complementary feeding), and health-seeking behaviours and cognitive stimulation. The adequacy of such care practices is determined by the caregiver's control over economic resources, autonomy in decision-making, and physical and mental status (L. Smith, C., and L. Haddad, 2000). All of these are affected by the caregiver's status relative to other members of the household. The caregiver's knowledge and beliefs also are important resources that influence what types of health services are accessed and what caring practices are adopted.

Factors affecting the health and environment conditions of the household include access to health care from affordable, qualified providers and safe water and sanitation services. Poor

environmental safety, including lack of adequate shelter, is also a critical determinant of malnutrition.

Insufficient resources available at the country or community level, and the political, social, and economic conditions that govern how these resources are distributed are the *basic* causes of malnutrition. The basic causes also influence institutions: the formal institutions that provide public sector services such as health and education, and the informal institutions that determine the social and cultural norms regarding the rights of women and vulnerable groups in the population.

**Figure 2. 4: Conceptual framework for the causes of malnutrition**



Source: Adapted from UNICEF and Engle, Menon, and Haddad ; Smith and Haddad (2000)

**Box 2. 1: Food security vs. nutrition security?**

It is important to distinguish between food security and nutrition security, two quite different terms often used interchangeably in the literature. Food security, an important input for improved nutrition outcomes, is concerned with physical and economic access to food of sufficient quality and quantity in a socially and culturally acceptable manner. Nutrition security is an outcome of good health, a healthy environment, and good caring practices, in addition to household-level food security. For example, a mother may have reliable access to the components of a healthy diet, but because of poor health or improper care, ignorance, or personal preferences, she may not be able, or may not choose, to use the food in a nutritionally sound manner, thereby becoming nutritionally insecure. Nutrition security is achieved for a household when secure access to food is coupled with a sanitary environment, adequate health services, and knowledgeable care to ensure a healthy life for all household members.

A family (or country) may be food secure, yet have many individuals who are nutritionally insecure. Food security, therefore, is often a necessary but not sufficient condition for nutrition security.

Source: World Bank, 2005

Given that the causes of malnutrition extend across many sectors from health, water and sanitation to the provision and distribution of food, an adequate response to address malnutrition would require inputs from many different sectors. Large-scale national responses to malnutrition in Bangladesh have focussed on the health sector and have fallen well short of achieving substantial reductions in malnutrition. The health sector response is no doubt important, but is not sufficient.

Although the need for a multisectoral response to malnutrition has long been recognised, the institutional arrangements needed for this to work are not clear. In the 1970s, multisectoral nutrition planning cells were introduced in many countries and placed centrally in a planning commission, or in the Office of the President (J. Levinson, F, and MMcLachlan, 1999). The planning cells were expected to be able to affect a broad range of development policies and programmes as a result of their high level placement. The United States Agency for International Development (USAID) and the Food and Agriculture Organisation (FAO) supported the assistance of 26 nutrition planning cells in developing countries throughout the 1970s (J. Levinson, F., 1999, C. Rokx, 2000). The Bangladesh National Nutrition Council described above was set up as part of this global push for multisectoral nutrition planning cells to coordinate nutrition policy.

The design and implementation of multisectoral strategies to address undernutrition have been far from successful in Bangladesh and around the world. The nutrition planning cells initiated in the 1970s had no significant impact because they did not have the authority or the resources to coordinate the relevant sectors effectively or to introduce incentives to promote cross-sectoral coordination. BNNC was no different.

A more realistic and workable institutional arrangement is to equip the different sectors with the required latitude and resources to carry out their own programmes, with the nutrition coordination agency being granted the authority to define overall policies and guide the allocation of resources (R. Heaver, 2005). The role of the coordination agency would be to ensure the correct incentives



are in place to motivate sector agencies to prioritise nutrition; to operate accountability mechanisms to ensure that the sectoral agencies do carry out their nutrition functions; and to engage in sectoral policy design and implementation to ensure that undernutrition remains a priority (The World Bank, 2006).

In short, the favoured approach is to “plan multisectorally, but implement sectorally” (S&T. Maxwell, C., 2000), and this forms the basis for this paper. The roles of the agriculture and microcredit sectors are examined with a view to identifying potential sector-specific resources that could be mobilised to alleviate malnutrition in Bangladesh.

### 3. Improving nutrition outcomes through interventions in the agriculture sector

Maximising the potential impact of agriculture on nutrition has long been of interest to policymakers and researchers. The types of interventions that are promoted have changed over time. In response to rising concerns about food shortages and growing populations in the 1960s and 1970s, large investments were made into increasing yields of staple food crops. It was thought that greater food availability would translate into improved nutrition outcomes. In the 1980s, Sen's (1981) work on the role of entitlements in causing famines, combined with the failure of previous investments to achieve significant improvements in nutrition, led to the focus on increasing agricultural incomes and economic access to food. In the 1990s, the emphasis shifted away from viewing agriculture solely as a mechanism for reducing energy deficiency, towards addressing micronutrient deficiencies as well. Notably also in the 1990s, the concept of food security, previously based on availability and economic access to food, was expanded to include food utilisation, diet quality and care issues (Box 3. 1). In recent years, there has been greater focus on the role of women in agriculture, intra-household resource allocation issues and knowledge about good nutrition.

The extensive literature on the impact of agriculture on consumption and nutrition contains few results of operational or policy use that could be used to guide agricultural investments and strategies. A recent World Bank report, *'From Agriculture to Nutrition: Pathways, Synergies and Outcomes'*, sought to fill this void by reviewing all of the existing work in this area. This chapter, builds on the World Bank report by examining the relevance of this evidence base for Bangladesh, paying close attention to the constraints and challenges of enhancing the impact of agriculture.

The next section, Section 3.2 lays out the pathways of influence through which agriculture affects nutrition. Section 3.3 presents the evidence on the impact of agricultural interventions on nutrition. Section 3.4 analyses the constraints to enhancing the impact of agriculture on nutrition. Section 3.5 describes the lessons learnt from this review that are applicable for Bangladesh and concludes this chapter.

#### Box 3. 1: Definitions of food security have evolved over time

In post-independence Bangladesh in 1971, the experience of famines and consecutive natural disasters leading to substantial reductions in rice production meant that food security was synonymous with achieving self-sufficiency in rice production and stabilisation of prices

*(P. Dorosh et al., 2004)*

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutrition food to meet their dietary needs and food preferences for an active and healthy life

*World Food Summit Plan of Action (1996<sup>2</sup>)*

<sup>2</sup> Quote taken from **The World Bank**. "From Agriculture to Nutrition: Pathways, Synergies, and Outcomes," Washington D.C.: The World Bank, 2007.

### ***3.1 What are the pathways of influence between agriculture and nutrition?***

Interventions in the agriculture sector can potentially influence all of the three underlying determinants of undernutrition, food intake, caring practices and healthy environment.

Agriculture directly affects food intake through the food production-consumption pathway. Increased agricultural production can lead directly to increased food consumption, particularly in subsistence or semi-subsistence settings as predominantly found in Bangladesh. Where there is greater integration with the market, increased production leads to increased consumption because of higher agricultural incomes and/or lower commodity prices, i.e. income and substitution effects. All three pathways depend on households' land and labour endowments, which determine the level of production of different crops. In Bangladesh, nearly one-third of households do not own any cultivable land and are therefore less likely to be able to consume their own produce. In this context, improvements in agricultural incomes and reduction in food prices represent the best ways in which to increase food consumption (M. Hossain, 2002). The pathways are also mediated by access to technology and markets, because of their effects on commodity prices.

However, increased food consumption does not always translate into improvements in nutrition. As defined in the conceptual framework, adequate food intake implies both an adequate quantity and quality of food. Gains in production and income may do little to improve nutrition if households simply switch to more expensive staples instead of diversifying their diet with increased fruit, vegetables and animal source foods. Moreover, the intra-household resource allocation mechanisms mean that the most nutritionally vulnerable members of the household, such as pregnant women and children aged 0-24 months do not necessarily gain from the increased access to food. Finally, even if food consumption increases for all members of the family, poor caring practices and ill health may prevent that from being converted to improvements in nutritional status.

The increased empowerment of women, who play a critical role in determining household food security and health provides a second set of pathways through which agriculture affects nutrition. First, it is well established in studies from Africa, Asia and Latin America that women's income has a significantly greater positive effect on child nutrition and household food security than men's income (J. Hoddinott and L. Haddad, 1994, E. Katz, 1994, A. Quisumbing et al., 1995). Women are also more likely than men to invest in their children's health and nutrition. Thus, interventions in the agriculture sector that empower women and enable them to gain more control over income and other assets are likely to improve the intra-household distribution of resources in favour of the more nutritionally vulnerable members. The positive effects of increases in women's income on childhood nutrition also appear to be more pronounced among the lowest income groups (The World Bank, 2007). Second, it is also known that women are who are reached by behaviour change communication and, health and nutrition education services prove to be effective agents in delivering improved nutrition outcomes (The World Bank, 2007). Third, interventions that increase the productivity of the time women allocate to agriculture can release them to perform their other roles as care-givers more effectively.

Agricultural growth can lead to broad improvements in nutrition outcomes through its impact on overall macroeconomic growth, providing an indirect pathway of influence between agriculture and nutrition. A recent cross-country analysis found that, at the national level, a 1 percent increase in agricultural yields lowers the percentage of population living on less than \$1 a day by between 0.64 and 0.91 percent (The World Bank, 2005c). The relationship between economic growth and malnutrition is weak, however. A doubling of the gross national product (GDP) in

developing countries has been associated with reductions in child malnutrition in the range of 23 to 32 percent only (L. Haddad, H. Alderman, S. Appleton, L. Song and Yisehac Yohannes, 2002).

### ***3.2 What is the impact of agriculture interventions on nutrition outcomes?***

Evidence on the impact of agriculture on nutrition outcomes is derived largely from studies documenting the direct impact of agricultural production and incomes, and women's empowerment. Empirical studies of more indirect impacts mediated through changes in agricultural commodity prices and macroeconomic indicators provide evidence on the impact on aggregate food availability only. The relationship between aggregate food availability and individual nutrition outcomes is complex however, and likely to be influenced by factors outside the agriculture sector as well. As a result, the review of the international evidence presented in this report focuses only on the impact of the direct pathways on nutrition. For Bangladesh however, all of the available evidence is presented regardless of whether it looks at aggregate or individual nutrition outcomes, as this report represents a first attempt to examine the linkages between agriculture and nutrition in the context of this country.

The international evidence presented here is taken largely from World Bank , which conducted an exhaustive review of all of the existing literature in this area. The evidence for Bangladesh was obtained through a separate review of the published and grey literature and through discussions with donor agencies and non-governmental organisations working in Bangladesh.

Following World Bank (2007) 'interventions' are broadly defined to mean changes purposefully introduced into an agricultural system to promote new technologies, management practices and marketing methods and other objectives, which may or may not include components specifically designed to improve nutrition. This review focuses on interventions that specifically included nutritional objectives because they are more likely to assess the impact of the interventions on nutrition outcomes.

The available evidence is classified by commodity type: staples, fruits and vegetables, and animal source foods, including dairy and fish products.

#### ***Interventions involving staple crops***

##### **Bangladesh: despite substantial increases in the production of rice and wheat, inadequate food intake and undernutrition persist, particularly among the poor and landless**

Domestic grain production has an important role to play in attaining food security and meeting minimum energy requirements in a largely subsistence-oriented, agrarian economy like Bangladesh. Rice and wheat account for 74% and 57% of the total per capita calorie and protein intake. For post-independence Bangladesh, confronted with a large famine caused by the civil war in 1971 and consecutive natural disasters, achieving self-sufficiency in rice production and the stabilisation of rice prices was a policy priority. The country's National Agricultural Policy states as its main objective the achievement of self-sufficiency in food through the increased production of all crops, including cereals and the creation of a dependable food security system for all (Government of Bangladesh Ministry of Agriculture, 1999).

From the mid-1970s through the 1990s, a combination of public and private sector interventions led to a doubling of rice production, as well as to substantial increases in wheat production. The real price of rice declined significantly as a result. Given land constraints and little scope for

extensive farming, Bangladesh has relied largely on the application of modern agricultural inputs and the adoption of improved varieties and crop management technologies to improve grain production (M. Hossain et al., 2005). More than half of the irrigated land and over 65% of rice cultivation is covered by high-yielding modern varieties of rice (M. Hossain, 2002).

Reforms since the 1980s aimed at reducing government interventions in the procurement and distribution of key agricultural inputs have contributed to the expansion of the market for inputs, stabilisation of input prices and adoption of improved technologies, particularly in the rice sector (M. Hossain, 1996). Prior to the 1980s, the procurement and distribution of all three inputs were controlled by the Bangladesh Agricultural Development Corporation (BADC), a semi-government organisation. The acceleration in the growth of rice production since the 1980s is attributed in part to efforts to expand private sector options in the market for key inputs.

Changes introduced into the seasonal composition of production of staples, particularly rice, have contributed to making cereal production more resilient to natural disasters and thus to greater food security (M. Hossain, F. Naher and Q. Shahabuddin, 2005). Cultivation of the *aus* (April-July) and *aman* (March – November) varieties of rice was previously associated with significant crop losses due to the late arrival of the monsoon rains and/or floods. Farmers now keep the land fallow during the monsoon season and grow the high-yielding *boro* rice crop during January-June, a change which has been made possible by increased access to irrigation. This change has helped reduce seasonable variation in prices and enabled the country to cope better with large floods as in 1988 and 1998.

Stabilisation of staple food prices remains a priority for ensuring household food security, particularly for the poor. Trade liberalisation from the early 1990s onwards and increased opportunities for private food grain trade have contributed to price stabilisation because imports provide a ceiling at import parity levels following poor harvests (M. Hossain, F. Naher and Q. Shahabuddin, 2005). However, subsidised sales from rice stocks are still needed in years when import parity prices may be unacceptably high due to a tight world market. Security stocks equal to at least three months of planned distribution need to be maintained (P. Dorosh, C. del Ninno and Q. Shahabuddin, 2004). The domestic procurement programme is therefore critical but is hampered by low rates of participation by farmers and by the fact that procurement prices are significantly above market rates due to rent-seeking and corruption (Q. Shahabuddin and K. Islam, M., 1999).

Despite increases in domestic production, national and household food security has not been achieved and progress towards this goal continues to be hampered by population pressures on scarce resources and widespread poverty. At the national level, Bangladesh is still dependent on rice and wheat imports and food aid, particularly in years following floods or droughts. Domestic food grain production remains susceptible to natural disasters, although improvements in the seasonal composition of crops described above has helped alleviate this somewhat. In addition, a rational and efficient policy response to transitional food insecurity caused by natural disasters is yet to be developed (M. Hossain, F. Naher and Q. Shahabuddin, 2005). At the household level, nearly 40 percent of the population lives below the food consumption-based poverty line, unable to afford a diet containing a minimum of 2,122 kilocalories (kcal) per person per day. Thus, poor households in Bangladesh are vulnerable to both transitory and chronic food insecurity.

In addition to significant deficits in total calorie intake, the diet remains seriously unbalanced - a trend attributable to insufficient domestic production and relative increase in prices of non-cereals such as pulses, oilseeds, fruits and vegetables (M. Hossain, F. Naher and Q. Shahabuddin, 2005). Nearly 80 percent of total calorie intake is derived from cereals. Although inflation adjusted

cereal prices have fallen by 40 percent over the past 25 years, real prices of lentils, vegetables and animal products have increased by 25-50 percent and fish prices have doubled (H. Bouis, E., 2002b). For instance, the large increase in *boro* rice and wheat production led to pulses and oilseeds, both important sources of proteins and micronutrients in the traditional Bangladeshi diet, being relegated to marginal land of low productivity; the area allocated to these crops declined substantially, as a consequence (M. Shahjahan, 2002). Meanwhile, the ratio of the price of pulses to the price of rice rose from 1.55 in 1975-77 to 2.59 in 1998-2000, indicating an increase in relative scarcity (M. Hossain, F. Naher and Q. Shahabuddin, 2005).

Imports of oils, pulses, sugar and fruit have risen to meet deficits in domestic production and represent a serious drain on the country's foreign exchange reserves. In response, the government has recently adopted a policy of crop-diversification but it is unclear at present what the impact of this policy has been.

The lack of food security and dietary diversity is worse among the poor. The poorest 40 percent of the population spends 70 percent of their income on food, compared to 53 percent for the richest 20 percent of the population. On average, 35 percent of food spending is on rice alone. Analysis of food consumption data from Household Income and Expenditure Surveys (Bangladesh Bureau of Statistics, Various years) from the early 1980s to 2000 shows that the food intake of the poorest groups in the population has become increasingly undiversified. While higher income groups gradually decreased their consumption of cereals and diversified their diet, lower income groups have allocated any incremental income to rice alone. The relative increase in the price of non-cereal foods such as fish, pulses and vegetables have contributed to the declining dietary quality of the poor (H. Bouis, E., 2002b).

In an agrarian economy like Bangladesh, the landless and those with limited access to land, are particularly vulnerable to food insecurity and undernutrition. Therefore, it is of particular concern that the structure of landownership in Bangladesh is increasingly fragmented (M. Hossain, F. Naher and Q. Shahabuddin, 2005). The percentage of 'functionally landless' households, defined as owning less than 0.2 hectares (ha) of land, which cannot be a significant source of food production or income, increased from 46 percent to 56 percent of all rural households between 1983-84 to 1996. Land size of about 1.0 ha is considered just enough to produce food and sufficient stocks to tide over a temporary crisis for a six-member family. In 1996, only 13.3 percent of rural households owned land of over 1.0 ha in size. Population pressures are contributing to the fragmentation of existing medium and large landholdings (The World Bank, 2005c).

Households with limited or no access to land are particularly vulnerable to malnutrition because their economic access to food is entirely dependent on market-based entitlements such as wages and prices. When modern high yielding rice varieties were introduced following the Green Revolution, the demand for hired labour increased sharply. Over the years, this has declined due to increased mechanisation of agricultural tasks. Agricultural wage income as a share of rural household incomes declined from 11 percent in 1987-88 to 4 percent by 2000 (M. Hossain, 2002). The landless are therefore increasingly dependent on non-farm work for their income. The seasonal nature of agricultural wages, limited opportunities to earn wages from non-farm employment in rural areas, as well fluctuations in food prices mean that a large proportion of the population suffers from chronic and transitory food insecurity in Bangladesh.

### **International evidence: commercialisation of staple crops has raised agricultural incomes and food consumption but has had no significant impact on child undernutrition**

To date, the only interventions on staple crops that have been evaluated from a nutrition perspective involve commercialisation of agriculture – the conversion from staple subsistence food production to commercial food production. As reported in World Bank (2007), the evidence is derived from a mix of conceptual reviews (P. Fleuret and A. Fleuret, 1980) and case studies that assessed nutrition outcome as an explicit objective (J. von Braun and E. Kennedy, 1994). Results from these and related studies have been synthesised in more recent review papers (K. DeWalt, 1993, E. Kennedy and H. Bouis, E., 1993, J. von Braun and E. Kennedy, 1994).

The available evidence points to fairly consistent positive impacts of commercialisation on food crop production and household income, particularly women's incomes and food expenditures (World Bank, 2007). Households' participation in cash crop schemes led to increased household income, and invariably to increases in food expenditures. The impact on energy intake was ambiguous because in some cases, the increase in food expenditures reflected shifts to more expensive items. Potential improvements in dietary diversity arising out of the increase in food expenditures were not quantitatively assessed. Increases in women's incomes were associated with increased household energy intake.

Commercialisation of crop production had no significant impact on child nutritional status, however. Notably, a related finding was that child morbidity levels were high in most cases. This led to the conclusion that agricultural interventions would have to be complemented by interventions that specifically address the other determinants of undernutrition, such as health and care-practices in order for them to have substantial impact.

Large gains in the production of staples worldwide have not resulted in equally large gains in nutrition outcomes. This is due in part to the fact that staples lack many of the essential micronutrients needed to reduce undernutrition. Realisation of this has led to growing interest in promoting the production and consumption of fruit and vegetables and animal source foods. Demand estimates in Bangladesh and elsewhere have demonstrated that the consumers are responsive to the price of non-staples and that consumption will increase if prices decline. However, if no effort is made to increase supply, prices of non-staples will continue to increase with population growth, with adverse consequences for nutrition, especially among the poor (H. Bouis, E., 2002a).

#### *Interventions involving fruits and vegetables*

### **Bangladesh: numerous small-scale gardening programmes have had positive impacts on nutrition, but scaling-up remains a challenge**

Vegetable and fruit production in Bangladesh meets only about 30 percent of national demand, and over two-thirds of this production occurs only in the winter. The production of vegetables has grown in recent years, stimulated by the distribution of vegetable seeds as part of the post-flood agricultural rehabilitation programme in 1998. Demand analysis of the patterns of consumption of households indicates that, initiatives to enhance the production of fruit and vegetables rich in Vitamins A and C, combined with nutrition education has the potential to significantly increase the intake of these two key micronutrients (H. Bouis, E., and M. Novenario-Reese, T., G., 1997). Yet, inadequate production and consumption of fruit and vegetables remains a serious constraint to improving the intake of micronutrients and thus, nutrition outcomes.

Over the past twenty years, numerous programmes have been introduced by NGOs, donor agencies and GOB to expand the production of fruits and vegetables, particularly through homestead gardening programmes. Homestead gardens are developed in a range of settings from backyards and the edges of fields to rooftops, and are generally located close to the house and to sources of water. Own consumption is the primary purpose of homestead gardens, although income may be generated through the sale of the produce. Produce from such gardens includes fruits, vegetables, herbs, secondary staples such as legumes, and sweet potatoes. The three main homestead gardening programmes in Bangladesh are described below, followed by a discussion of how attempts to integrated homestead production of fruits and vegetables into the GOB's National Nutrition Programme proved less than successful.

The NGO Gardening and Nutrition Education Surveillance Project (NGNESP) initiated by Helen Keller International (HKI) in the early 1990s combined the provision of technological and other inputs to expand household-level production of fruits and vegetables, with nutrition education. The project was implemented in collaboration with local NGOs and the Government of Bangladesh. The NGOs were responsible for establishing village-level nurseries and homestead gardens. The nurseries served as a network for transferring the know-how on low-cost, low-risk gardening practices and for producing and distributing seeds and saplings. The group leader, who managed the nursery was also responsible for facilitating nutrition and health education through peer education among the women's groups. The project began as a pilot and was expanded incrementally, covering about 900,000 households or 4.5 million people by 1993.

NGNESP increased the production and consumption of fruit and vegetables in the areas it covered and increased the number of varieties consumed (A. Talukder and et al., 2000). Moreover, children aged 12-59 months who lived in a household with a homestead garden, who had not received Vitamin A capsules in the six months prior to the survey, faced a lower risk of night blindness than comparable children in households without gardens. Sustainability of the programme was enhanced by linking the project with local NGOs' ongoing development programmes and by establishing strong linkages with participating communities. Active targeting of women meant that 73 percent of the gardens were managed by women, and women had considerable autonomy over gardening decisions and the use of the income earned through the sale of the garden produce (A. Talukder and et al., 2000).

The Integrated Horticulture and Nutrition Development Programme (IHNDP) funded by UNDP and GOB combined initiatives to increase the efficiency of horticulture production with a nutrition education strategy (Lalita Bhattacharjee et al., 2007). A community-based nutrition education programme was established, whose main objectives were to create awareness about the consumption of fruit and vegetables, promote behavioural change and provide information about the preparation and processing of horticulture products. Landless, marginal and small farmers, particularly women, were the main targets of IHNDP. Evaluation of the programme showed that the consumption of leafy and yellow vegetables and Vitamin C-rich fruit had increased among programme households, and that the intake of iron, Vitamin A and calcium was higher among the relevant target groups. Since it is not clear how intervention and control households were selected, it is difficult to assess the robustness of these results.

Projects implemented by CARE-Bangladesh to strengthen homestead production systems for planned, year-round production have been found to increase the supply, consumption and sales of fruit and vegetables among households, with positive effects on nutritional status (M. I. Khan and S. Begum, 2002). Three of these projects are homestead projects that work with functionally landless groups, mainly women, to develop their capacity to optimise land utilisation in and around the homestead. A common finding is that homestead production and income generating



activities have greater impact on nutrition when combined with interventions that promote nutrition and health knowledge and lead to behaviour change, as well as reduce gender-discriminatory packages.

Following the experiences of the programmes supported by HKI and others, a household food security (HFS) component was incorporated into BINP and NNP, GOB's first large-scale nutrition programmes in the country. The HFS component provided supplies and technical assistance to set up nutrition gardens as well as poultry farms, and targeted poor, rural households. While the programmes implemented by HKI, FAO/UNDP and CARE had never achieved full national coverage, inclusion of the HFS component into the national nutrition programmes provided for significant scaling up of interventions to promote household production of fruit and vegetables in Bangladesh. By 2005, HFS activities were being implemented through NNP in 105 of the 486 upazilas in the country.

The HFS component integrated into the national nutrition programme was not successful and was suspended due to poor performance in 2005. This programme continues to be suspended at the time of writing this report. Reasons why HFS interventions under NNP were not effective are explored below in a case study.

#### **International evidence: homestead gardening has a strong impact on nutrition outcomes when combined with nutrition education and gender-sensitive initiatives**

Despite the wide range of fruit and vegetable production systems that exist, only homestead garden production systems have been implemented with an explicit nutrition objective (World Bank, 2007). The nutrition impacts of homestead gardens have been relatively well documented. In (P. Berti et al., 2004, S. Gillespie and J. Mason, 1994, M. Ruel, T., 2001). Four factors have been highlighted in the literature as critical for the success of homestead gardening programmes, their impact on nutrition in particular: inclusion of nutrition education and promotion, gender-sensitive initiatives, adaptability to local conditions, and monitoring and evaluation.

While homestead gardening alone has little impact on nutrition outcomes, it has the potential to significantly improve the nutritional status of the population when it is combined with effective educational and promotional interventions and an explicit gender-sensitive approach (Ruel, 2001). Interventions used to be focussed narrowly on the provision of supplies and technical support needed to implement homestead gardening projects. Once significant human capital related components were built into homestead gardening projects from the mid-1990s onwards, the nutrition impact improved substantially (P. Berti, J. Krasevec and S. FitzGerald, 2004, M. Ruel, T., 2001). Human capital components included education, social marketing and mass media campaigns that target behaviour change, and the explicit inclusion of gender considerations into projects. The impact of nutrition education is important, and independent of maternal education. Households with nutrition knowledge allocate larger shares of their household food budgets to micronutrient-rich foods, and are less likely to reduce their household food budgets when staple food prices increase (S. Block, 2003).

A lack of understanding and adaptability to local conditions is often blamed for the failure of homestead gardening (L. Brownrigg, 1985). The literature shows that homestead gardening can be a sustainable, low-cost, low-risk strategy for improving food and nutritional security when gardens are well adapted to local conditions and preferences (International Institute of Rural Reconstruction (IIRR), 1991, D.J. Midmore et al., 1991) (D.J. Midmore, V. Ninez and R. Venkataraman, 1991). Participatory planning and design approaches that combine the knowledge

of local farmers with that of technical experts can help minimise biophysical, agronomic and economic constraints. For instance, raised beds and water-loving plants could be encouraged in flood prone areas, and water conserving horticultural practices encouraged in dry areas (R. Marsh, 1998). In general, homestead gardens are found to be sustainable if input and labour requirements can be modified to suit local constraints.

Close monitoring and evaluation provides regular feedback on the strengths and weaknesses of the gardening strategy. This allows for fine-tuning of training and other input needs.

The global evidence with regard to the effectiveness of homestead gardening on food consumption and nutrition is consistent with the Bangladesh experience. Gardening programmes have proved successful when they integrated nutrition education and gender components into the programme, paid attention to local conditions and needs and incorporated good monitoring and evaluation. Like in Bangladesh, success stories around the world remain small in scale and offer few lessons for scaling up.

### *Interventions involving animal source foods*

#### **Bangladesh: production of nutrient-dense small fish promotes nutrition but few known impacts from promotion of poultry and livestock**

Fish represents the main type of animal food in the diet in Bangladesh, and a critical source of protein and micronutrients. Small fish, which constitute 50 percent of all fish eaten during the production season, are eaten whole and are especially rich in micronutrients such as calcium and Vitamin A (N. Roos et al., 2006). The production of fish has increased in recent years due to aquaculture development.

Aquaculture development in Bangladesh has had a negative impact on access to fish for the poor however, and is associated with shifts in consumption from small fish to larger fish with poor micronutrient density. The poor tend to catch small fish in seasonal floodplains. Access to these resources has fallen as freshwater capture fisheries come under increasing pressure from agriculture, population growth and embankment construction for flood control. Furthermore, increased enclosure for aquaculture development has reduced access to common water resources because pond aquaculture is mainly practiced by pond owners and is not an option for the poor (G. Md. N. Islam et al., 2002). Aquaculture produces mostly carp, which contributes fewer micronutrients than small fish. A study in Gazipur District showed that between 1990 and 1999, the growth of aquaculture led to a significant reduction in the market price of silver carp, making it 20 percent cheaper than small fish. Meanwhile, rural households fished less frequently, fish intake was halved and the proportion of nutrient-dense small fish consumed fell sharply (H. Bouis, E., et al., 1998, N. Roos et al., 2003).

Nonetheless, aquaculture can be reoriented to help the poor, as evidenced by efforts during the 1990s to promote semi-intensive polyculture in small, homestead ponds using nutrient-dense Mola (a small fish) together with the carp species. Surveys of fish consumption following this intervention showed that small fish intake provided about 40 percent of the Vitamin A and 32 percent of the calcium recommended intake of an average household during the peak fish production season (N. Roos, M. Islam, M., and S. Thilsted, H., 2003). Notably, the integration of Mola into existing carp culture had no negative economic consequences, and added about 10 percent to the total productivity of the pond.

Poultry is also a substantial contributor to the local diet. The introduction of small, low-risk inputs through the semi-scavenging model to homestead poultry farms has been found to raise output. It did not lead to increased egg or chicken consumption, but participating households ate more fish. Thus, the intervention led to increased income and subsequent dietary change (H. Nielsen et al., 2003) .

Poultry farming was also included into the HFS component of the national nutrition programme in Bangladesh. Like the homestead gardening component, this failed. Reasons for this are discussed in the case study below.

Dairy production in Bangladesh typically involves cows maintained as bull mothers to produce a small quantity of surplus milk for household consumption only. The establishment of cooperatives for smallholder dairy farmers in 1973 and the introduction of subsidies for milk farmers in 1991 have contributed to increases in milk production. Numerous other policies are in place to increase milk production through government and private dairy farms, but the impact of these on dairy consumption and nutrition is not known. The lack of a well-organised marketing system for livestock and dairy products, which are perishables is key constraint to expanding the production and consumption of dairy foods (M. Khan, A.,S., and M. Rashid, H.,, 2002) .

#### **International evidence: mixed impacts on nutrition of interventions to expand production of animal source foods**

Interventions involving animal source foods have had a positive impact on production, income and food expenditures but mixed impacts on nutrition (J. Leroy, L., et al., Unpublished, The World Bank, 2007). Programmes to increase the consumption of animal source foods have greater potential to address micronutrient deficiencies because of the higher bio-availability of Vitamin A, iron and zinc. Existing evaluations of aquaculture development, dairy and livestock production and poultry farming programme can shed little light on what aspects of the interventions help enhance the impact on nutrition.

*CASE STUDY: Integrating nutrition gardening and poultry farming into the national nutrition programme in Bangladesh*

This is an exploratory analysis of the poor performance of the HFS component under NNP. Representatives from the government and NGOs who were involved in the implementation of the programme, and HKI were interviewed to get an overview of the problems associated with NNP–HFS and learn lessons for future implementation and scaling-up of HFS.

***Program interventions and institutional arrangements***

The Household food security (HFS) component implemented through the Bangladesh Integrated Nutrition Project (BINP) was the first, large-scale, national programme to expand homestead production of fruit, vegetables and animal source foods. The project was designed to provide the following services to households and communities:

- Nutrition garden project (NG) – the provision of seeds and seedlings, and the establishment of a privately run community nursery
- Poultry for nutrition (PFN) project – the provision of hybrid birds that have high egg yield and demand timely inputs. A system was developed primarily to help with the provision of micro-credit as well as poultry immunization and marketing.

BINP's successor, the National Nutrition Project (NNP), continued with HFS activities under its area-based community nutrition programme. The HFS activities were, however, suspended in December 2005 due to poor performance.

Under NNP, tripartite contracts were signed between the NGOs, NNP Project Monitoring Unit, and, the Department of Agricultural Extension (DAE) of the Ministry of Agriculture for NG services, and the Ministry of Fisheries and Livestock (MOFL) for PFN services. NNP financed the HFS component; its implementation and all administrative related work were the responsibilities of DAE and MOFL. At the field level, agricultural officers from DAE and poultry officers from MOFL implemented the HFS activities in collaboration with the NNP staff.

***Impact***

A performance audit was carried out on the 10 NGOs providing core nutrition services under NNP in 2005 and showed clearly that the HFS component was performing poorly. (Data Management Aid, 2006):

- **Insufficient coverage of HFS activities.** HFS activities were operational only in 7 percent of households visited, whereas the intended coverage was 96 percent.
- **Mis-targeting of HFS activities.** Both NG and PFN, services were poorly targeted; 36 percent of NG beneficiaries and 44 percent of PFN beneficiaries owned more land than the maximum limit for eligibility to participate in this programme.
- **Shortage of technical and supervisory staff.** There was a shortage of technical staff, particularly for PFN with only 16 percent of poultry technicians present. Community level staff for PFN was also lacking, with only 47 percent of Poultry Health Supervisors present at the CNCs.
- **Availability of inputs inadequate.** The availability of key inputs such training, credit, seeds and fertilizer for NG and PFN were not sufficient to meet demand.
- **Outcomes less than satisfactory.** Less than half (47 percent) of the NGS were producing fruits or vegetables (35 percent were producing vegetables), and in 22 percent of cases, gardens did not exist. On average, there were 10 nutrition gardens rather than the 12 that were required.
- **Weak supervision by NNP.** Only 40 percent of the CNCs had been visited by agricultural or poultry technicians or supervisors in September 2005.

### ***Explaining the poor performance of HFS under NNP: perspectives of key stakeholders***

The HFS programme under BINP suffered from a range of implementation problems and was unlikely to have had any systematic nutritional impact. These problems included low coverage, poor targeting, high dropout rates, unmet demand for inputs, inadequate services provided by field workers and managerial arrangements that failed to generate ownership and responsibility (D. Pelletier et al., 2005). The problems identified by the officials interviewed for this case study as underlying the failure of HFS under NNP, are consistent with those found under BINP.

First, there were *major flaws in the design* of the HFS component: the target population was not well-defined and the choice of technology was inappropriate. HFS activities were intended to target poor households based on the criteria that they own some land up to 80 decimal for nutrition gardening and up to 50 decimal for rearing poultry. However, poor households did not have sufficient land to do nutrition gardening and/or rear poultry. The beneficiaries of HFS, therefore, were not the poorest of the poor.

The type of technology selected for both nutrition gardening and poultry was not suitable for implementation in large parts of Bangladesh. The Kalikapur model was used for NG activities but it was restrictive. The model works best in elevated areas, whereas most of the land in Bangladesh is low lying. Moreover, soil conditions across the country were not conducive for this model. The kind of birds selected for PFN was not appropriate either. The hybrid variety chosen had high mortality rates as weather conditions in Bangladesh were not conducive to them.

Second, there were weaknesses in the implementation and institutional arrangements. Senior level coordination mechanisms between NNP and DAE, and NNP and MOFL functioned well. Funds were disbursed by NNP while the administrative control remained with DAE and MOFL. At the implementation level, there was *weak coordination between NNP officials and agricultural and livestock officers*. The agricultural and livestock officers had no incentive to work on NNP activities as they were accountable to the Ministries of Agriculture and Fisheries and Livestock and not the Ministry of Health. Moreover, there was a shortage of livestock officers in the field. Some of the NGOs delivering HFS services also lacked technical expertise in agriculture and poultry sectors.

Third, HFS under NNP adopted a demand-driven approach<sup>3</sup>, but the supply of inputs did not keep up with the demand created. However, *the supply of poultry in particular could not keep up with the demand created*. This was partly due to the lack of capacity of the NGOs providing the services. Besides, NNP did not have capable poultry experts and there were frequent transfers in the Ministry of Fisheries and Livestock.

Fourth, the HFW programme may have been demand driven, but was not truly participatory in terms of design.

Other issues affecting implementation of HFS activities included delays in fund disbursement and short-term extensions of NGO contracts.

### ***Lessons learnt***

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<sup>3</sup> The design of HFS under NNP represented an improvement over BINP in that it moved away from the supply-driven approach.

- The HFS component should have been designed after consultation with the households with regard to the kinds of birds and vegetables they would like to grow, instead of imposing a specific model on them.
- The HFS component should have been tailored according to local needs and made area-specific. Before food security, livestock security should be ensured. Poultry should be combined with other animals like cow and goat.
- Poultry activities should only be implemented in areas where poultry experts are available to provide technical assistance. NNP may require assistance in hiring poultry experts. The provision of an allowance for the livestock officer working in the field would also be appropriate.
- Many of the NGOs implementing HFS did not have expertise in this area, which constrained their ability to effectively implement and supervise HFS activities.
- CNPs, the key service providers under BINP and NNP, felt that they did not fully own the HFS component.
- The supervisory role of NNP should be strengthened

Finally, a key lesson learned from HKI programmes in this area in Bangladesh is that successful implementation of HFS activities depends on the extent to which the local context has been taken into account. A one-size fits all programme implemented at the national level is not likely to be effective given the wide range of agroclimatic environments in Bangladesh. For example, under the HKI project, rabbits were reared in areas in the Chittagong Hill Tracts because the local inhabitants have a preference for rabbit meat. Similarly, ducks are more likely to be reared than hens in areas prone to flooding, because they can adapt better to the environment. Integrating local aspects into the HFS activities is important and could be achieved through a more participatory approach to planning and design.

It is important to note that interventions by HKI, FAO and CARE have never been scaled up to the extent the NNP-HFS programme was. Inevitably, small-scale programmes have a higher probability of success because they can respond more appropriately to the needs of the local population and the context of the area. However, scaling up of HFS is essential to substantially improve the nutritional status of the population.

### *Technological interventions in agriculture*

Technological interventions in agriculture, ranging from the introduction of improved crop varieties to plant-breeding and post-harvest technologies have had a significant impact on agricultural production, incomes and consequently, food consumption and nutrition.

### **Introduction of improved staple crop breeds improved overall nutrition by increasing food availability and incomes**

New crop breeding technologies associated with the Green Revolution substantially increased agricultural productivity and led to rising food production per capita during the 1980s and 1990s despite sharp increases in population growth. Simulations of trends in food availability and prices that would have prevailed had the Green Revolution not occurred show that the proportion of malnourished children in developing countries would have been 6-8 percentage points higher; malnutrition in South Asia alone would have been 12-15 percent higher (R. Evenson, E., and D. Gollin, 2003).

The introduction of improved crop varieties had indirect effects on nutrition through their impact on labour and incomes of agricultural households. Early on in the Green Revolution, the demand for agriculture labour expanded substantially in Bangladesh and elsewhere, leading to an increase in the real value of consumption and a shift towards more varied diets; as the mechanisation of agriculture increased in later stages, labour demand fell (H. Binswanger, P., and J. von Braun, 1991, P. Hazell, B., R., 1987, M. Hossain, 2002, E. Kennedy and H. Bouis, E., 1993). In Bangladesh, this did not necessarily have an adverse impact on rural households, as it freed up labour for non-farm employment leading to the development of petty trading and a range of personal services with the increase in microcredit supplied by NGOs (M. Hossain, 2002).

Some studies have found a strong income-nutrition relationship associated with the introduction of improved crops, while the income-nutrition relationship has been ambiguous in others. Case studies in the Gambia, Guatemala and Rwanda showed that a 10 percent increase in income lead to 3.5 – 3.9 percent increase in energy intake and a 1.1 – 2.5 percent increase in anthropometric indicators among children; the income link was weaker in other studies, however (World Bank, 2007). The time and labour allocations of women and children were affected, which hampered improvements in nutrition outcomes (H. Binswanger, P., and J. von Braun, 1991, J. von Braun and E. Kennedy, 1994, 1986). Access to new varieties of rice was also associated with reduced seasonal fluctuations in women's body weight, which in pregnant women, is likely to lead to a reduction in the incidence of low birthweight (R. Kerr, B., 2006, M. Lawrence et al., 1987) .

Research to improve crop technologies has a vital role to play in Bangladesh with regard to improving food security at the national and household levels; but, the government's National Agricultural Research System (NARS) is finding it increasingly difficult to develop new and profitable technologies to suit the changing needs of farmers (The World Bank, 2005c). Inadequate and unstable funding, weak management of the research system, declining quality as well as relevance of research, and limited access to new sciences are some of the reasons for this failure.

### **Plant-breeding has expanded the range of crops available for farming, contributing to increased dietary diversity and consumption of micronutrients**

New plant-breeding technologies have expanded the range of crops available for homestead gardens and farms by developing breeds that are adapted to a range of environments, including hostile ones. For instance, landless households have benefited from developments in simple hydroponics and container gardening (Marsh, 2002). The growth of urban gardening, which contributes to a significant proportion of total non-grain urban food supply (United Nations Development Programme (UNDP), 1996) is another example of the adaptation of gardening to more challenging environments. The Food and Nutrition Division of the FAO and the Asian Vegetable Research and Development Centre (AVRDC) have played a key role in this area by promoting the production and consumption of nutrient-rich vegetables that are indigenous to local areas (FAO-AVRDC, 2002).

In Bangladesh, research undertaken at the Horticulture Research Centre at BARI is limited. It has released a few varieties of different crops but their impact has been limited, partly due to a poor availability of seeds and a high reliance on imported seeds of vegetables (World Bank, 2005).

### **Post-harvest technologies led to nutrient-rich fruits and vegetables being made available throughout the year**

Post-harvest technologies allow farmers to preserve perishable fruits and vegetables, particularly seasonal ones, and enable greater access for both producers and consumers to these nutrient-rich foods throughout the year. By reducing the extent of post-harvest losses in production due to spoilage, this technology also contributes to lower market costs and consumer prices. Post-harvest losses have been estimated to be as high as 30 percent and 50 percent of all fruits and vegetables produced in India and Malawi respectively (Rabobank, 2006 and Mwangwela, 2001 quoted in World Bank, 2007). In Bangladesh, BARI undertakes limited work on processing of produce through its Post-Harvest Technology Division due to resources and capacity constraints.

### **Bio-fortification may prove to be a cost-effective way to significant increase micronutrient consumption**

Bio-fortification refers to the breeding of new crops that are rich in bio-available micronutrients. It is argued to be cost-effective because a one-time investment in breeding yields micronutrient-rich plants for several years into the future unlike the continual financial outlays required for micronutrient supplementation programmes. In Bangladesh, recent research has shown that the development of iron-dense rice varieties may be a suitable strategy to help eradicate the high prevalence of iron deficiency anaemia (K. Kabir, A., et al., 2002). Micronutrient fortification can also be done as part of food processing as in the case of Vitamin A fortification of cooking oils in Bangladesh. Table 3. 1 provides a comparison of the relative costs of supplementation, bio-fortification and food fortification.

**Table 3. 1: How much nutrition an \$80 million investment can buy, by intervention**

<i>Supplementation</i>	<i>Fortification</i>	<i>Plant breeding / bio-fortification</i>
Provides Vitamin A supplementation to 80 million women and children in South Asia for two years, 1 in 15 persons in total population at a cost of 25 cents for delivery of each pill, each effective for six months	Provides iron fortification to 33 percent of the population of South Asia for two years. Cost of fortification is estimated at 10 cents per person per year	Develops six nutrient dense staple crops for dissemination to all of the world's people for consumption year after year. This includes dissemination and evaluation of nutritional impact in selected countries

Source: Table 1, p.32 in (H. Bouis, E., 2002a)

### **Animal-breeding increases the productivity of livestock allowing households to shift to more animal-based foods and increase their income by producing for the market**

Technological changes that improve the productivity of livestock allow households to diversify from plant-based food to animal-based food, thus improving their nutrition through greater intake of protein, iron and other micronutrients (World Bank, 2007). The adoption of cross-breeds of cattle has generally increased the amount of surplus production available for domestic consumption. In an intervention involving cross-bred cows in East Africa, intervention households consumed more energy, fat, protein, retinol and iron than other households, (M. Ahmed, M., et al., 2000) and women participating in the intervention consumed more milk (G. Mullins et al., 1996). In one case in India however, greater production for the market using cross-breeds led to households consuming less milk (H. Alderman, 1987).



### *Community-driven approaches*

Integrating nutrition into community-driven development (CDD) programmes in agriculture may hold potential for mobilising the agriculture sector to improve nutrition. Community-driven nutrition programmes are advocated because they are more likely to reflect the community's needs, are directly accountable to the community and enjoy a greater degree of ownership, which enhance the programme's sustainability (R. Heaver, 2003). A CDD approach to improving nutrition through the agriculture sector would take into account the community's own assessment of its agro-economic constraints, food security situation and, health and nutrition needs. When combined with growth monitoring, a potential monitoring tool to help communities define the level and distribution of undernutrition, the CDD programme could effectively target agricultural interventions to areas where it will have most impact (The World Bank, 2006) .

This report found only two studies, which use participatory approaches characteristic of CDD in designing food security and nutrition programmes. For the programme in Kano, Nigeria (C. Dirorimwe, 1998), participatory rural appraisals (PRA) were held, which brought together members of the community with technical officers from the government and FAO. The action programme designed through the PRA focused on awareness creation about malnutrition, increasing farmers' access to agricultural inputs and extension services, prevention of parasitic diseases and diarrhoea, improved access to drinking water and monitoring and evaluation of the action programme. The programme in Luapula Valley, Zambia followed a similar community action planning strategy (K. Callens and E.C. Phiri, 1998). As neither study has been evaluated, little is known about how effective this approach to designing nutrition interventions was relative to more top-down approaches.

An example of a CDD approach in the agriculture sector in Bangladesh is the Social Investment Program Project (SIPP) implemented between 2003 and 2007. Major project interventions included efforts to raise awareness about the health and education and provide training for income-generating activities such as cow fattening and goat rearing (S. Haider, J., et al., 2004). Impacts of project activities on nutritional outcomes of participating households are yet to be quantified.

A major risk in taking a CDD approach to designing nutrition programmes is that communities may not necessarily invest in nutrition interventions when they are empowered to choose their own development priorities (Heaver, 2003). A recent World Bank review of CDD approaches showed that projects involving quantitative goals such as the construction of infrastructure were more likely to be successful than those involving qualitative goals such as capacity building and or the quality of training (World Bank, 2005d). This is because communities underestimate the seriousness of malnutrition, which is often not a very visible problem. While advocacy to encourage investments in nutrition would be consistent with the CDD philosophy, Heaver (2003) argues that it may not be sufficient to make nutrition an investment priority. Even the availability of growth monitoring data, which would highlight the extent of undernutrition in the community, may not make a difference.

Two alternatives are offered to get around this problem of underinvestment in nutrition by communities. One is to make nutrition interventions a requirement in areas where malnutrition is serious by making CDD funding conditional on a proportion being earmarked for nutrition. The other is to make a separate fund available for nutrition interventions only. It is not known if either approach has been taken in CDD projects around the world.

As CDD approaches are scaled up, several criticisms have emerged regarding the effectiveness of this approach to development, which are relevant here (G. Mansuri and V. Rao, 2004). First, community participation appears not to have been effective at reaching the poor. There is evidence that most projects are dominated by the elite, and that targeting and project quality are worse in more unequal communities. Second, it is unclear how critical the participatory elements are for ensuring good outcomes, despite rhetoric about the role they play in ensuring bottom-up development. If the relationship between community participation and outcomes is indeed weak, then it begs the question why it is desirable to adopt this approach for areas such as nutrition, where it is already known that CDD may result in underinvestment. Finally, although monitoring and evaluation is key to the success of CDD projects, this remains a weak area. Despite a rapid increase in World Bank funding for CDD projects, most projects have not been subjected to rigorous evaluation.

CDD projects perform best when they are undertaken in a context-specific manner, with a long time horizon and with careful and well-designed monitoring and evaluation systems (G. Mansuri and V. Rao, 2004). Rapid scaling often results in poorly trained facilitators, which is detrimental to the project given the critical role played by these staff. Among World Bank supported projects, community capacity enhancement was most successful when the projects supported indigenously matured participatory efforts or when they provided sustained, long-term support to communities (World Bank, 2005d).

### ***3.3 What are the challenges?***

#### *Institutional constraints*

Ministries of agriculture have a key role to play in scaling up agricultural interventions to improve nutrition. Such a supply-driven approach is inadequate because nutrition is also affected by consumption-related factors in other sectors that are beyond the control of agriculture ministries. The administrative division of responsibilities and jurisdictions between agriculture and the other sectors gives rise to bureaucratic barriers, which pose real constraints to the systematic cross-sectoral collaboration.

The mandates and priorities of each sector tend to be fairly narrowly defined and often treat nutrition as a secondary objective (World Bank, 2007). The mandate for the agriculture sector may be to increase crop yields, with improving human nutrition as a secondary objective. At the national-level, ministries are known to prefer mandates that lie within their own sectoral sphere of influence (E. Thomson, C., 1978). The same narrowly defined sector-specific priorities are used during planning and resource allocation, which means that there are no incentives for carrying out jointly coordinated activities. Within each sector, staff have specialised training in their own discrete areas leaving little room for overlap. As a result, there is a lack of shared perspectives and practices across sectors. This also means there is limited capacity to do nutrition analysis in order to correctly identify problems and solutions (World Bank, 2007)

The failure of the HFS component of the National Nutrition Project in Bangladesh is attributable in part to poor coordination with the Ministry of Agriculture and the Ministry of Fisheries and Livestock. Although staffs from these two ministries were seconded to the NNP office in Dhaka, at the community level where the programme was implemented, there was poor coordination between staff from the agricultural extension services and the community nutrition workers.

Given the challenges in undertaking cross-sectoral action to improve nutrition, and the failure of multisectoral nutrition planning agencies, it is important to look at other institutional mechanisms that may help ease this constraint. World Bank (2007) highlights the importance of making nutrition a national priority and setting it out in a national master plan like the PRSP so that sectors such as agriculture cannot relegate nutrition to a second-level priority. Public sector resource allocations to the agriculture sector could even be made contingent on how the sector contributes to nutrition and other broader development goals. Another approach is to explicitly include nutrition objectives to agriculture programmes, and make the agriculture-nutrition link clear to agriculturalists.

It is often argued that the local level at which CDD programmes are implemented would facilitate cross-sectoral interventions, as many of the inter-sectoral conflicts occur at the national level. The evidence suggests there is no guarantee that state agencies representing the different sectors will work collaboratively with local communities. In Ghana and Uganda where there has been considerable decentralisation of state functions in recent years, district-level agriculturalists have reported that local concerns do not necessarily supersede sectoral concerns in guiding their actions (T. Benson et al., 2004). A CDD approach would therefore not entirely help alleviate institutional constraints.

### *Nutrition transition*

The double burden of malnutrition in many developing countries means that agriculture faces a new challenge of ensuring sufficient supplies of staples and micronutrient foods, while discouraging over-consumption of nutrient-poor, energy-dense foods. The twin processes of globalisation and urbanisation have led to an increasing demand for high-value, mostly processed foods relative to cereals and pulses, and lower levels of physical activity; a combination of changes referred to as the “nutrition transition” (The World Bank, 2007); (C. Hawkes and M. Ruel, T., 2006). This is associated with large increases in obesity and related conditions such as hypertension and cardiovascular disease, while high rates of undernutrition persist. The view that agriculture’s role in Bangladesh is to ensure food security by providing as cheap a source of abundant calories as possible is less appropriate now more than ever.

Eventually, the nutrition transition and associated increase in diet-related chronic illnesses will lead to an increase in the demand for functional foods that carry health benefits. Moreover, consumers will show a higher willingness to pay for these foods, providing agricultural producers with an opportunity to reverse the downward trend in food prices they face at present. However, the ability of poor producers to switch to these crops will depend on access to arrangements like contract farming, which link farmers with large, supermarket-type supply chains (World Bank, 2007).

### *Increased market orientation of agriculture*

The high degree of market orientation of agriculture means that agricultural markets, in addition to production, play a crucial role in determining food availability and access today. In horticulture for instance, production has increased over the years but consumption remains inadequate worldwide (Hawkes and Ruel, 2006). This is due to failures in the market supply chain associated with post-harvest losses and inadequate access to markets for small producers. To increase consumption of micronutrient-rich fruits and vegetables the market supply chain needs to be adapted and strengthened to make produce more affordable to households, as well as increase poor producers’ access to markets.

### ***3.4 Lessons learnt: opportunities for improving nutrition through agricultural interventions***

- National food security has improved in recent years in Bangladesh, thanks to large increases in the production of staple food crops. However, household food security has not been achieved for a large proportion of the population, particular poor, landless households. With limited land and labour entitlements with which to gain access to food, chronic and transitory food insecurity are major problems for the poor.
- The downward trends in overall undernutrition rates, led in part by the increased supply of staple foods masks the fact that there has been no change in the prevalence of undernutrition among the poorest groups in the population. The increased availability of cereals from increased domestic production has contributed substantially to rural incomes, reduced market prices (in real terms) and thus improved access to food. While the importance of these changes cannot be denied, it must also be recognised that achieving household food security for the poor is still a challenge in Bangladesh.
- Moreover, improvements in nutrition outcomes require not only food security, but also greater dietary diversity and better health and nutrition behaviours. Dietary diversity has worsened over the years for the poor in Bangladesh. The growth in cultivation of staple crops marginalised the land available for the production of key non-staples such as pulses and oilseeds. As a consequence, these protein-rich foods have become relatively scarce and their prices have risen. The production of fruit and vegetables has not increased either. Both these factors partly explain why dietary diversity has shown little improvement, particularly for the poor.
- Potential interventions to address undernutrition through the agriculture sector fall into two groups: those that do not require the involvement of the nutrition sector, and those that do need to be complemented and integrated with inputs from the nutrition sector.
  - Technological interventions in agriculture can potentially improve nutrition significantly, without any specific interventions from the nutrition sector. The introduction of modern inputs and improved crop varieties for staple crops, plant breeding to improve the adaptability of fruit and vegetable crops, and improvements in storage and transportation of perishable foods have all contributed to increasing food security and access to a more diversified range of foods to a larger population at a lower price. Investments into the research and dissemination of agricultural technologies are critical for improving nutrition through the agriculture sector. Current research into improved crops, plant breeding and post-harvest technologies in Bangladesh is not sufficient and the resources and capacity for research needs to be strengthened considerably.
  - Interventions designed to expand the production of specific commodities such as fruit and vegetables in homestead gardens do need to be integrated with nutrition education in order to have a significant impact on nutrition. In Bangladesh and elsewhere, interventions to encourage the production of fruits, vegetables and animal source foods have proved to be effective in improving household food security and dietary diversity only when they are combined with efforts to provide nutrition education. However, doing this successfully remains constrained by the larger, institutional problem of integrating the agricultural and nutritional sectors in working towards a common goal.

The expansion of local fish production is another example of an intervention that can improve nutrition with significant inputs from the nutrition sector itself. In Bangladesh, aquaculture interventions to increase supply of fish had a negative impact because they led to shifts in consumption from nutrient-rich small fish to nutrient-poor large fish, and marginalised the poor. However, the development of polyculture in small homestead ponds offers a good solution to the problem of expanding fish supplies while ensuring that nutrient-rich fish are produced and consumed.

CDD approaches may be used to mobilise agriculture sector resources for improving nutrition. They use participatory planning methods to take into account local conditions and constraints in the design of programmes. Since nutrition is not a very visible problem, communities may not treat it as a priority investment. It may be necessary to introduce some form of conditionality to ensure that communities do invest in nutrition, if a CDD approach is taken. Again, this requires significant inputs from the nutrition sector.

- Administrative divisions in the responsibilities and jurisdictions of the agriculture sector and other nutrition related sectors makes cross-sectoral collaboration difficult. Given the failure of earlier efforts to create multisectoral nutrition planning agencies, a more appropriate approach is to ‘think multisectorally, act sectorally’. At the national level, nutrition should be made a policy priority and the right incentives created for the agriculture sector to work towards programmes that have improving nutrition as a key objective. One possibility is to make budget allocations for agriculture conditional on designing and implementing programmes to promote nutrition.
- Interventions in the agriculture sector that empower women have a positive impact on nutrition. It is well established in the literature that when women are empowered enough to have a greater say in the intra-household distribution of resources, they are more likely than men to devote resources to improving the health and nutrition status of their households. Therefore, priority must be given to gender empowerment when designing interventions.

However, the design of such interventions should take into account the constraints faced by women and avoid overburdening them. In general, women face unequal rights relative to men in terms of access to household resources, and greater institutional biases than men in access to training and new technological inputs (C. Pena et al., 2006). Failure to understand cultural norms and the gender dynamics in the household can result in unanticipated outcomes. For instance, it is often found that moving from subsistence agriculture to cash cropping or intensified production of livestock results in the control over cash income transferring to men (World Bank, 2007). Women are also time-constrained because they have multiple responsibilities besides agriculture. A study in Bangladesh found that, while women regard child care as a duty, they are likely to sacrifice self-care in order to fulfil household duties during times of stress (M. Levinson et al., 2002). Interventions designed to empower women in agriculture should find ways of alleviating these time constraints.

- Monitoring and evaluation of the nutrition outcomes of agricultural interventions has been relatively weak worldwide. As a result, it is difficult to learn from existing interventions as to which aspects contribute to a positive impact on nutrition and which aspects are detrimental to this. It is absolutely critical that monitoring and evaluation efforts are strengthened in order to exploit the agriculture sector to bring about substantial improvements in nutrition.

- Scaling up agricultural interventions that are known to have a positive impact on nutrition remains the greatest challenge. The majority of interventions that have successfully increased household food security and the consumption of micronutrient-rich foods have been relatively small-scale ones. The small scale has allowed them to tailor the interventions to specific local conditions and constraints, which partly explain their success. Efforts to scale up such interventions, as in the case of household food security programme under NNP in Bangladesh, have met with limited success.

## **4. The potential contribution of microcredit programmes to improving nutrition**

In Bangladesh, the microcredit industry currently provides access to credit to nearly thirteen million poor households in Bangladesh and has been associated with significant reductions in household poverty, as well as the empowerment of women. It thus represents a potentially viable option for improving the nutrition outcomes of some of the most vulnerable groups in the population, either through improvements in income and food security, or more directly through access to nutrition services and products provided in combination with financial intermediary services.

The objective of this chapter is to examine the available evidence on the impact of credit and related interventions on nutrition outcomes in Bangladesh and elsewhere, with the objective of providing recommendations on new interventions, or the scaling up of existing interventions in Bangladesh. The first section defines microcredit and provides background information on the extent and scope of microcredit programmes in Bangladesh. The second section outlines the pathways through which increased access to credit could potentially influence nutrition outcomes. The third section reviews the evidence. The fourth section considers the main constraints to this approach to improving nutrition Bangladesh, and is followed by a summary of lessons learnt in the last section.

### ***4.1 Scope and definitions***

#### *Microcredit and its components*

**Microcredit is the extension of small loans to groups of poor people, especially poor women, for the purpose of investing in self-employment programmes (UNICEF, 1997).**

Typically, microcredit programmes involve mobilising the poor into groups, giving them training, encouraging them to save a small amount of money and helping them to identify a source of income generating activity. The group's incentive to monitor the behaviour of individual members is its collective future ability to borrow (Mark Pitt, M., and A. Khan, R., 1996).

The growth of credit cooperatives and lending groups as alternative vehicles of rural financial intermediation was spurred on by the failure of formal institutions to reach the rural poor. Transaction costs and default risks associated with lending to people without access to collateral or regular sources of income were expected to decrease as the groups incorporated some form of joint liability and monitoring. In reality, this approach has been successful in a range of settings from Bangladesh, Cameroon, Malawi and Malaysia to South Korea, although problems have been found in several other countries including Egypt, India, Kenya, Lesotho and Venezuela.

**Microcredit is often linked with access to health, nutrition and education services and key social development messages.**

As microcredit programmes evolved, the need to incorporate financial and non-financial intermediary services became apparent because standard loan and savings products were not sufficient to help the poor exploit the full potential of their increased access to credit. Non-financial services provided included the provision of input supplies, skills training and marketing

support for micro-entrepreneurs. Complementary packages also include nutrition and health education, community health programmes and health insurance.

The provision of health, nutrition and education services as complementary to microcredit is advocated for several reasons. On the one hand, investment in human capital increases the chances of the borrower becoming a productive micro-entrepreneur, especially since borrowers are drawn from some of the most deprived groups in the population. On the other hand, increased access to credit and incomes does not automatically lead to better health and nutrition. Other inputs are required, such as access to services and information about the benefits of using health and nutrition services. Moreover, the group-based nature of microcredit programmes means that they provide access to a captive audience to which to administer critical lessons about good health and nutrition as the availability of credit provides an incentive for people to attend the group sessions. Such settings also allow for interactive, needs-based learning, which is more effective than the more didactic approach taken at a health centre, for instance. Finally, a vast majority of clients of microcredit programmes are women, who have proved to be effective agents for the transmission of information about health and nutrition.

### **The focus on women is integral to microcredit programmes.**

Microcredit programmes have generally targeted women as clients. Not only do they prove to be more financially responsible with better repayment performance than men, they are also more likely than men to invest the increased income towards the household's welfare. More importantly, access to financial services helps empower women to become more confident, more assertive, more likely to participate in family and community decisions, and better able to confront systemic gender inequities (Littlefield, 2003). This is particularly important in the context of Bangladesh, where the tradition of *purdah* imposes real constraints on women's sphere of influence, and limits their ability to acquire new skills and knowledge and grow in confidence through interactions with the outside world. Training to empower women and familiarise them with laws governing their lives is provided as part of group-sessions held with borrower women.

### *Microcredit in Bangladesh*

The microcredit sector in Bangladesh is one of the largest in the world, with 14.3 million active borrowers (Credit and Development Forum, 2006). The sector has flourished in the last two decades. The 1970s saw the advent of microcredit in Bangladesh. Grameen Bank first tested a microcredit scheme centring on group-based credit delivery with peer monitoring. As demand grew, two other NGOs – BRAC and Proshika – started providing tiny collateral-free loans to the poor. By the late 1980s, the predominant model was to provide loans to a target group of poor households, with peer monitoring and strong supervision by the NGO providing the loan. During the 1990s, NGO staff supervision of loans became more rigorous and professional with the use of computerized management information systems. Development partners contributed to the expansion of revolving loan funds. The Palli Karma Sahayak Foundation (PKSF) was established in 1990 as a central microcredit funding and capacity building organisation for the microcredit sector.

There are now more than 1200 NGOs in the country providing credit services, out of which approximately 200 NGOs have large microcredit programs (Credit and Development Forum, 2006). The micro-credit sector is dominated by four NGOs – Grameen, BRAC, Proshika and



ASA, accounting for 86 percent of the total micro-credit borrowers. As of September 2004, PKSF had disbursed BDT 319 million as microcredit through its 198 partner organizations<sup>4</sup>.

Examining microcredit disbursement data by sub-sectors can shed light on what potential there is to influence nutrition through microcredit programmes. Analysis of total disbursements by 283 of the largest NGOs in Bangladesh showed that in 2005 a quarter of all disbursements were allocated to sectors such as agriculture, fisheries and health, which have direct implications for nutrition (Table 3. 2). Analysis of Grameen data showed that between 1997 and 2005, 25-30% of microcredit spending was on agriculture or livestock alone.

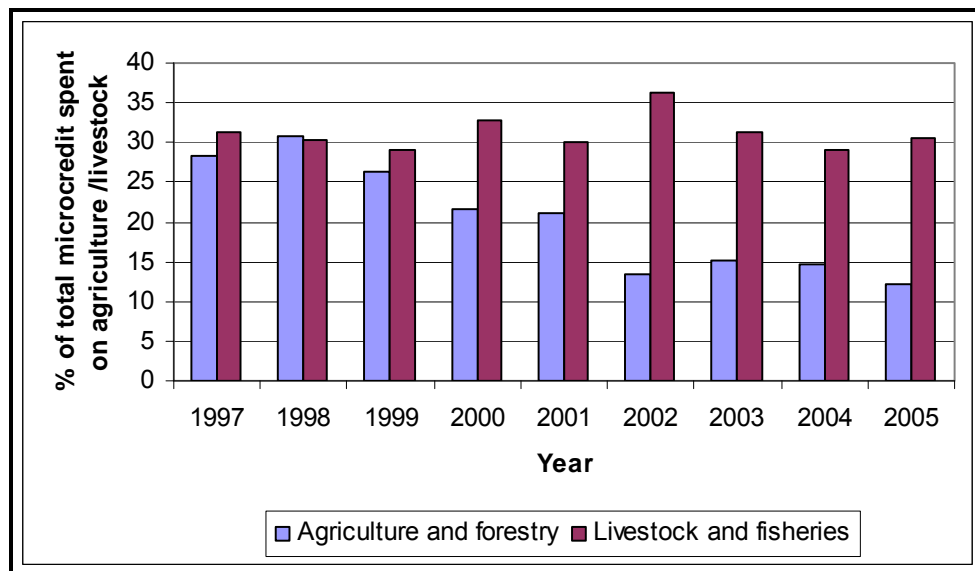
**Table 3. 2: Breakdown of microcredit disbursements by nutrition-related sectors, 2005**

Sector	% of total microcredit disbursement
Agriculture	7.5%
Fisheries	3.28%
Livestock and poultry	13.77%
Health	0.76%
Education	0.25%

Note: These are data for 283 microcredit NGOs as of December 2005

Source: (Credit and Development Forum, 2005)

**Figure 3. 1: Share of Grameen microcredit expenditures attributable to agriculture and livestock projects**



Source: Authors' analysis of data taken from Grameen Bank Annual Reports between 1997 and 2005

#### **4.2 Pathways of influence between microcredit and nutrition**

Like interventions in the agriculture sector, microcredit has the potential to influence all three underlying determinants of nutrition. Figure 3. 2 illustrates the main pathways through which microcredit can potentially influence nutrition outcomes.

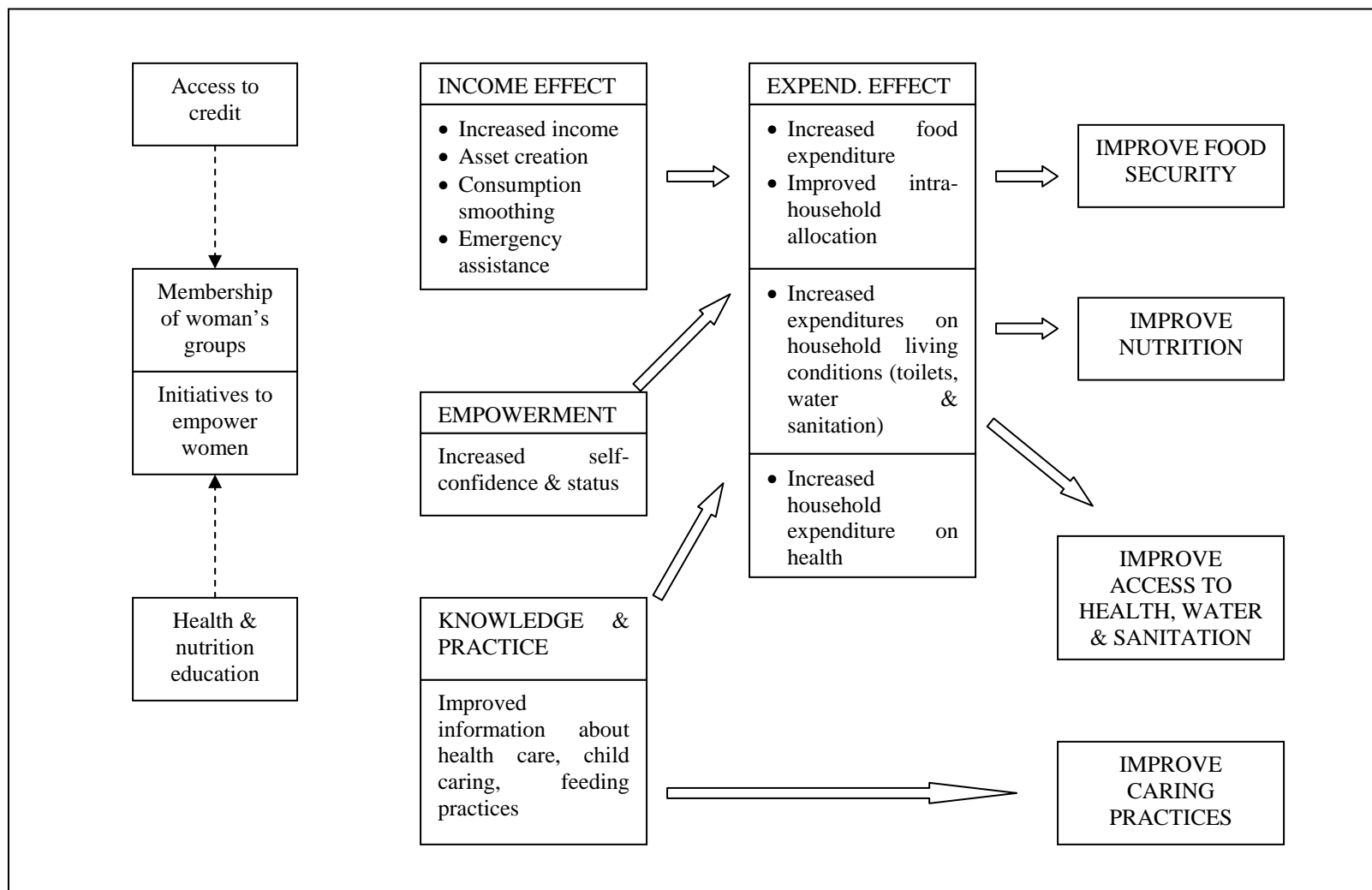
<sup>4</sup> From PKSF website: [www.pksf-bd.org](http://www.pksf-bd.org)

Improved access to credit is associated with increased household income and savings, and reduced vulnerability of the household. This is primarily achieved through increased income earning opportunities and the potential for diversifying income sources derived from farm and non-farm work. Access to credit also promotes the accumulation of assets. In addition, it is associated with lower labour supply variability and income smoothing. Together, income smoothing and the accumulation of savings reduce the household's vulnerability during crises.

The increase in income is associated with increased expenditures on food, health care and living conditions, in general. Households increase their calorie intake, as well as consume a greater diversity of foods, which has a positive impact on food security and potentially, on nutrition. Furthermore, the potential for consumption smoothing reduces the likelihood of transitory food insecurity, which affects a large majority of poor, particularly rural, households. The incremental income is also invested in household assets, which promote access to improved water and sanitation sources. Households may also spend more on health care.

Health and nutrition education and credit channelled through women's groups, with complementary programmes to empower women have a significant effect on all three underlying determinants of nutrition. Women who are empowered to get involved in household-decision making, when armed with income and knowledge about how to promote health and nutrition, can ensure that household resources are allocated appropriately to improve food security, health care and living conditions. Moreover, they are likely to have greater influence on the intra-household allocation of resources, ensuring that both female and male children receive adequate nutrition.

**Figure 3. 2: Pathways of influence linking microcredit and nutrition**



### **4.3 What is the impact of microcredit programmes on nutrition?**

Most evaluations of microcredit programmes that examine household-level effects look at the impact on income and assets, vulnerability to shocks and poverty. The impact on women's empowerment is also examined frequently, but the impact on health and nutrition outcomes and behaviours is not. The literature search carried out for this report specifically looked for evaluations that not only examined the impacts on income, poverty and women's empowerment, but also health and nutrition behaviours and outcomes. Both published and unpublished studies were examined.

The reliability of the findings of microfinance evaluations depends crucially on the data and methods used, and the extent to which they control for selection bias. This problem arises because participation in microcredit programmes is often endogenous. For instance, women who participate in microcredit programmes are more likely to be motivated to improve the welfare of their household, particularly their children's nutrition status, than women who choose not to participate. As a consequence, standard regression analysis to estimate the impact of programme participation on nutrition outcomes would lead to biased and inaccurate estimates. Potential solutions to this are to use quasi-experimental study designs with outcomes measured before and after the introduction of microcredit, as well as a matched intervention and control group; or, to use instrumental variable techniques. Very few studies included in this review adequately control for selection bias by using these techniques.

The evidence with regard to the effects of access to credit on the intermediate variables - income-related variables, empowerment, and health and nutrition knowledge - are examined first. Having established the strength of the association between access to credit and the intermediate variables, this section then examines the impact on nutrition itself. Table 3. 3 contains a summary of the studies reviewed for this paper that examined the impact on both the intermediate and outcome variables.

#### *Income effects*

**Bangladesh: access to microcredit has significantly reduced the vulnerability of households and proved a more important effect than any gains in income.**

A reduction in vulnerability means that poor households are able to smooth their consumption and consequently, avoid the hardships associated with seasonal shortfalls in income, one of which is transitory food insecurity. Building up assets through their increased access to credit allows households to better absorb unanticipated shocks (H. Zaman, 2004).

As Table 3. 3 shows there is no clear evidence that microcredit has had a significant impact on income or poverty in Bangladesh (H. Zaman, 2004). Khandker (S. Khandker, R., 1998) and Morduch (J. Morduch, 1998) came to quite different conclusions with regard to the impact on poverty using the same data, but different methods for correcting for selectivity bias.

What is clear is that reduced variability in labour supplies and improved income-and consumption-smoothing have contributed to reducing households' vulnerability. Pitt and Khandker (1996) find that microcredit has the largest impact on consumption during the hungry season, and that those households with low consumption during the hungry season are the ones most likely to participate. Morduch shows that consumption variability is 47 percent lower for eligible Grameen households, 54 percent lower for BRAC households and 51 percent lower for eligible BRDB households, compared to the control group. Morduch's results further show that

programme participants do not benefit from microcredit in terms of greater consumption levels, but they participate because they benefit from risk reduction (Morduch, 1998 quoted in Zaman, 2004).

**International evidence: the impact of microcredit on income-related variables is ambiguous, but it is clear that access to credit reduces household vulnerability**

Participants in microcredit programmes increased their incomes and assets in some studies, but not others. However, as Table 3. 3 shows, the one finding that is consistent across most of the studies is that microcredit participants were better able to diversify their income sources and thus, reduce their vulnerability to economic and other shocks, compared to non-participants. As already noted, households' ability to reduce their vulnerability to shocks and increase consumption-smoothing is a critical for maintaining adequate levels of food security.

*Empowerment effects*

**Bangladesh: membership of microcredit programmes has contributed to women's empowerment.**

Membership of microcredit programmes was found to have had a positive effect on women's decision-making role, marital stability, control over resources and mobility in a study of 36 villages in Bangladesh (S. Amin and A. Pebley, 1994). There is also evidence the women's status within the household improved in part because of their ability to generate income (S. Hashemi et al., 1996, R. Naved, 1994). These effects have been questioned by studies that claim that women have partial, limited or sometimes no control over their loans in a large majority of cases (A. Goetz and R. Gupta, S., 1996). On the whole however, the evidence that microcredit improves the status of women is more convincing than evidence to the contrary (H. Zaman, 2004).

**International evidence: microcredit programmes are associated with greater empowerment for women**

The acquisition of skills and the ability to generate income for the household have improved women's status within the household, as well as helped them gain self-confidence. In most cases this was associated with greater decision-making power within the household on issues such as food and health care for children, which has direct implications for nutritional outcomes. Since the studies reviewed for this study, which were selected primarily for their focus on nutrition, did not always examine empowerment effects, it is difficult to assess the strength of the pathways between empowerment and nutrition.

*Knowledge and practices effects*

**Bangladesh: microcredit programmes can be effective in promoting health knowledge but the evidence is limited.**

A review of the experience of BRAC microcredit programmes in Bangladesh found that participation in credit forums, along with exposure to the media and education, was strongly associated with improved nutrition knowledge, after controlling for all other relevant factors (Hadi, 2001). Moreover, the duration of participation in credit forums and exposure to media were significantly more likely to increase health knowledge than other factors. This study is based on cross-sectional data without adequate controls for selection bias, which means that the

improvements in health knowledge cannot be directly attributed to the credit-forum based education programme.

The study does make important observations about what it is about credit-based communication that makes it an effective tool for the delivery of health knowledge, however. An important feature of this approach is that health promotion has been integrated with other aspects of the programme. Women have to be familiar with basic health practices in order to become eligible to receive credit and there is a mandatory health check-up for borrowers at the time they receive credit. Second, the participants in the group are relatively homogenous in terms of age and socio-economic status, which facilitated interactive learning amongst members. Third, the format and content of the discussions are flexible enough to accommodate group members' specific concerns. Finally, the approach was more cost-effective because a range of services from training on income generating activities to health promotion was provided as part of one package.

**International evidence: the evidence is limited, but does suggest that the quality of education may be critical for significantly improving knowledge and behaviours.**

The Credit with Education programmes in Bolivia and Ghana promoted health and nutrition practices such as giving newborns colostrum, appropriate complementary feeding, exclusive breastfeeding for the first six months, and the correct ways to care for and treat children with diarrhoea. Participants in both countries reported significantly positive differences in how they fed or cared for their children who were born after the introduction of the programme, compared to older children. However, there was significantly greater improvement seen across a range of practices in Ghana, but not Bolivia. The quality of education received by participants appears to have a strong impact on whether, and to what extent, knowledge learning and recommended behaviour change takes place (B. McNelly and A. Watson, 2003).

### *Nutrition effects*

**Bangladesh: microcredit has contributed to improved nutrition through increased income and social mobilisation; the reduction in vulnerability to shocks has been critical for reducing fluctuations in household food security and consequently, nutrition.**

Khandker (1998) examined the impact of the three largest microcredit programmes in Bangladesh – Grameen, BRAC and RD-12 - on nutrition. He found that credit provided to women had a large and significant impact on two measures of nutritional well-being for both male and female children. A 10 percent increase in women's credit increased the arm circumference of girls by 6 percent. Response elasticities of height-for-age related to increases in women's credit were high, with 1.42 for boys and 1.16 for girls. Credit provided to men on the other hand, had no statistically significant impact except on girls' body-mass index (BMI). A 10 percent increase in men's credit increased girls' BMI by about 3 percentage points. A separate longitudinal study of BRAC clients found that credit programme members were significantly less likely to be severely malnourished relative to the control group, and that the extent of severe malnutrition declined as the length of membership increased.

The impact of credit on household vulnerability is likely to have had a significant impact on nutrition outcomes. It was mentioned above that one of the main outcomes of increased access to credit in Bangladesh was reduced vulnerability caused by improved consumption smoothing. This would have reduced fluctuations in food security as well. Foster (1995) examined the role of credit markets in smoothing fluctuations in child weights following a severe economic shock caused by the floods in 1988. He found that existing mechanisms to provide access to credit were

partially effective in reducing the impact of the flood on child weight in the better-off households. Moreover, landless and landowning households alike were found to make substantial use of credit for consumption-smoothing during the post-flood period. He concludes that, since the high costs of transferring resources between time periods is a likely contributor to fluctuations in child growth in the poorest households, small-scale credit programmes targeting these households may provide significant benefits.

Greater empowerment and reduced economic vulnerability for women has played a key role in improving nutrition outcomes. Even if credit were to improve incomes and household food security, intra-household resource allocation mechanisms may not favour the more nutritionally vulnerable members of the household, such as children and women, in the allocation of food. Such resource allocation constraints are alleviated when women have a greater say over household resource allocation decisions. By improving women's income generating potential and consequently, their ability to take decisions within the households, microcredit programmes may have improved intra-household food allocations. This partly explains Khandker's results above with regard to the different effects of male and female borrowing on child nutrition.

**International evidence: the impact of microcredit and nutrition is ambiguous, suggesting interdependencies exist in the relationship between the two.**

The impact of microcredit services on nutrition has been examined in a few studies around the world. The *Credit with Education* studies in Bolivia and Ghana examined the impact on food security<sup>5</sup> as well as nutrition. Studies conducted by Zeller and Sharma in China and Madagascar examined the impact on household caloric availability. Other studies for India, Indonesia and Zimbabwe only examined the impact on food consumption. All of these studies are summarised in Table 3. 3

Participation in the Credit with Education programmes had a significant positive impact on household food security and nutrition in Ghana, but not in Bolivia. In Ghana, the proportion of families who had experienced household food insecurity in the last year declined by almost half between the baseline and follow-up, but remained unchanged for both non-participating households and the control group. In Bolivia, participant, non-participant and control groups all experienced a decline in household food insecurity, but the differences between the three groups were not statistically significant.

Similarly, while in Ghana, there were positive and significant improvements in the nutritional status of the children of participants relative to non-participants, there was no evidence of any improvements in Bolivia. In Ghana, height-for-age and weight-for-age improved, signifying gains in both short-term and long-term nutrition outcomes. In Bolivia, significant differences were found between baseline and follow-up weight-for-age Z-scores only when differences in the quality of education received had been controlled for (B. MkNelly and C. Dunford, 1999, 1998).

In China and Madagascar, microcredit services were found to have a positive impact on caloric availability (M. Zeller and M. Sharma, 1998). However studies in Malawi (A. Diagne and M. Zeller, 2001) and Cameroon (Schrieder, 1996, quoted in MkNelly and Watson, 2003) show no significant impact. In Zimbabwe, India and Indonesia (C. Barnes et al., 2001, N. Kabeer and H. Noponen, 2005, Panjaitan-Drioadisuryo Rosinthan, D., and C. Kathleen, 1999), participation in

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<sup>5</sup> Household food security is measured by whether the respondents' families had experienced a time in the last 12 months when they had to eat less or less well, and if so, how long the period had lasted and how their households coped.

microcredit programmes was associated with higher rates of consumption of protein-rich foods than for the control group.

The mixed results in the literature indicate that there may be important interdependencies in the microcredit-nutrition relationship, which have not received sufficient attention. The package of financial and non-financial services offered with microcredit, and the type of clients may influence the strength of the impact of microcredit on nutrition. The microcredit programme in Malawi for instance, was entirely dependent on income effects associated with increased access to credit. As the programme failed to have any impact on income, no improvements in consumption or household welfare were observed. Notably, this programme did not include any form of social mobilisation, which could have potentially contributed to investments in human capital through improved health and nutrition.

A weakness in this literature is that the microcredit-nutrition link is seen as primarily influenced by increases in income and food consumption. That nutrition may also be improved through higher incomes and more investment in household living conditions, for instance through better access to improved water and sanitation sources, has received little attention in the literature. For instance, the evaluation of the impact of the SEWA Bank in India (M. Chen, A., and D. Snodgrass, 2001) found that participation in microcredit leads to increased expenditures on food as well as household durable goods. SEWA also provides home loans which could potentially contribute to better access to improved sources of water and sanitation and thus, nutrition. This link was not evaluated. However, the study showed that about 80% of the housing loans were used for improving the infrastructure, including electricity and water connections, latrines and drainage.



**Microcredit on income, women's empowerment, knowledge and nutrition**

	Type of data	Impact on income, assets and vulnerability	Impact on women's empowerment	Impact on knowledge and practices	Impact on nutrition
g	Data on weight and diarrhoea for 1,698 children collected during two rounds; also data on assets and borrowing	Landless and landowning households used credit for consumption smoothing during post-flood period	Not examined	Not examined	Existing credit mechanisms partially effective in reducing impact of flood on childweight in better-off households; children in landless households were vulnerable.
d	Multipurpose household survey in 1991-92	Largest consumption effect is during the hungry season	Grameen Bank credit has greatest positive effect on women's power and independence.	Not examined	No significant nutritional effect
d	Multipurpose household survey in 1991-92	Impact on consumption of women borrowing is twice as high as for men borrowing. Women's borrowing increased their labour supply and non-land assets.	Not examined directly, although study focuses on impacts of women's borrowing	Not examined	Women's borrowing has significant impact on male and female child nutrition. 10% increase in credit to women increased girls' arm circumference by 6%.
d	Multipurpose household survey in 1991-92	No significant impact on consumption or income poverty. Significantly reduces			

Country/ Type of programme evaluated/ Source	Type of data	Impact on income, assets and vulnerability	Impact on women's empowerment	Impact on knowledge and practices	Impact on nutrition
		consumption variability, household vulnerability			
BRAC programme (Zaman 1999)	Consumption data from 1,072 households in one district + data from 1,568 women	Largest impact on poverty when moderate poor clients borrow more than 10,000 taka; suggests threshold effects exist	Greatest impact is on women's control over assets and knowledge of social issues	Not examined	Not examined
PKSF PO's programme (BIDS 2001)	Longitudinal data between 1997-2000 of 3000 households	Significant impact on poverty status and less vulnerability during crises	Not available	Improvements in child immunisation and use sanitary latrines more noticeable for program members	Not examined
Credit-based health education programmes provided by BRAC (Hadi, 2001)	Survey of 500 women in 1998; collected data on involvement with credit forums, socioeconomic characteristics	Not examined	Not examined	Duration of credit programme participation associated with increases in health knowledge	Not examined
<b>BOLIVIA</b> <i>Credit with Education</i> programme (MkNelly and Dunford)	Income, empowerment, health and nutrition outcomes measured for programme	Incomes of over 60% of clients increased Greater diversification of income sources led to	Improved women's self- confidence and status within the	Significant impact on child caring and feeding	Prevalence of food security declined for all groups; no significant difference

Country/ Type of programme evaluated/ Source	Type of data	Impact on income, assets and vulnerability	Impact on women's empowerment	Impact on knowledge and practices	Impact on nutrition
1999)	participants, non- participants and a randomly assigned control group, during baseline and follow-up surveys.	consumption smoothing. 86% of client households reported increase in savings; 78% had no savings previously.	community; increased participation in local government	practices including breastfeeding, introduction of complementary foods, use of ORS and DPT; quality of education significantly affected uptake of good practices	in child nutritional status, except when quality of education is controlled for
<b>GHANA</b> <i>Credit with Education</i> programme (MkNelly and Dunford 1998)	Income, empowerment, health and nutrition outcomes measured for programme participants, non- participants and a randomly assigned control group, during baseline and follow-up surveys.	Clients significantly increased income and diversified sources; 80% of clients had secondary sources of income, compared to 50% of non-clients.	Improved women's self- confidence and status within the community; women play more active role in community life, including ceremonies	Significant impact on child caring and feeding practices including breastfeeding, colostrum, introduction of complementary foods, use of ORS and treatment for diarrhoea and DPT	Proportion of households experiencing food security declined by 50% for participants, but not others; positive, significant improvements in child nutritional status for participants
<b>INDIA</b>					

Country/ Type of programme evaluated/ Source	Type of data	Impact on income, assets and vulnerability	Impact on women's empowerment	Impact on knowledge and practices	Impact on nutrition
SEWA Bank credit and savings programmes (Chen and Snodgrass, 2001)	Panel data on 798 women and their households, micro-enterprises and other informal sector activities from 1998 and 2000.	Increased household income and improved ability to cope with shocks	Improved women's transactional relationship with employers through greater empowerment	Not examined.	Increased food expenditures; up to 80% of housing loans spend on improving access to electricity, water connections, latrines and drainage
PRADHAN self-help group microcredit (Kabeer and Noponen 2005)	Survey of matched sample of 400 women members and non-members conducted in 2003	Members had more land and livestock access; more diversified cropping patterns	Members more likely to make decisions on their own regarding child education, livelihoods, purchase or sale of assets	Not examined	Members more likely to consume chicken, milk or fish, and less likely to have food shortages than non-members; more likely to have better housing and improved water sources
<b>INDONESIA</b> Credit and related training programmes (Panjaitan-Drioadisuryo and Cloud 1999)	Survey of 121 women randomly selected from project members, and 94 comparable women from the same villages, but neighbourhoods where credit was not yet offered.	Average incomes of clients increased by 112% and 90% of households moved out of poverty	Project members more likely to make decisions on their own regarding their business expenditures and savings and jointly with husbands on other household matters.	Not examined.	>90% of project members and only 51% of non-members ate three meals a day; > 70% of project members ate fish daily. 80% of non-members ate only rice and vegetables.
<b>MALAWI</b>	Survey of 4,699	No significant impact on	Not examined	Not examined	No significant impact

Country/ Type of programme evaluated/ Source	Type of data	Impact on income, assets and vulnerability	Impact on women's empowerment	Impact on knowledge and practices	Impact on nutrition
Access to formal and informal credit in rural financial markets. (Diagne and Zeller, 2001)	households consisting of programme participants and non-participants.	incomes			on food security or nutritional status
<b>UGANDA</b> 3 microcredit programmes; one includes health and nutrition education (Barnes, Gaile and Kibombo, 2001)	Panel data on a randomly selected sample of client and non-client micro-entrepreneurs from 1997 and 1999. Baseline sample was 1,332. 72% of the sample in the endline survey.	Reduced household vulnerability through diversification of income sources.	Programme strategies helped empower women through the acquisition of skills and knowledge, and an increase in the number of savings options.	Not examined	Not examined
<b>ZIMBABWE</b> Zambuko Trust microcredit programme combined with business management training and advice; no health and nutrition education components (Barnes, 2001)	Panel data from 1997 and 1999 of a randomly selected sample of 691 client and non-client entrepreneurs.	No significant impact on incomes, after adjusting for inflation. Greater diversification of income sources. Impact on poverty reduction constrained by household size and structure.	Not examined	Not examined	Significant impact on consumption of meat, fish or chicken among extremely poor client households; marginally significant impact on frequency of milk consumption

#### ***4.4 What are the constraints to improving nutrition outcomes through microcredit programmes***

##### *Institutional constraints*

Questions remain over the best institutional structure in which to provide nutrition and health services in the context of microcredit: whether the microfinance institution (MFI) itself should provide these services, or whether the MFI should simply facilitate direct linkages with providers of other non-credit services.

Underlying the attempts to combine social mobilisation with credit services is the argument that increases in income alone cannot substantially improve health and nutrition. In the literature, estimates of the income elasticity of the demand for calories are relatively low, ranging from approximately 0 to 0.5. While higher income is certainly associated with higher spending on food and greater food security, it is not necessarily associated with improved caloric intake and nutrition. For instance, households often choose to spend their incremental income on more expensive, but not necessarily nutrition-enhancing foods. Besides, poor health may hinder any progress in nutritional outcomes.

Adding nutrition components to microcredit programmes, the argument goes, not only enhances the impact of microcredit on nutrition outcomes, but also represents an efficient way to provide nutrition services. The availability of credit acts as an incentive to draw borrowers, a majority of whom are women to the education sessions. Integrated provision also helps achieve economies of scale by sharing valuable information on clients and other non-informational resources such as buildings and vehicles. It is also argued that nutrition services, as a form of human capital investment improves productivity and leads to greater returns on the loans that are given out.

Critics claim however, that when MFI's start having to provide health and nutrition services, the integrated provision undermines the efficiency with which microcredit itself is provided. Despite potential complementarities in nutrition and income *outcomes*, it is not clear if there are any complementarities in the *production* of nutrition and credit (S. Smith, C., 1999). MFIs rarely have comparative advantage in the provision of health and nutrition education, or *vice-versa*. Resolving this debate requires clear evidence on the effectiveness of combined nutrition and credit programmes, and the institutional features that strengthen or weaken the impact of the programme components.

The available evidence is quite ambiguous. Using data from Ecuador and Honduras, Smith (1999) found no compelling evidence of the benefits of tying microenterprise credit cooperatives with health and education services, as opposed to providing credit-only services. In Ecuador, there was no clear association between correct breastfeeding practices and participation in combined credit and health programmes; results were mixed with regard to other health and nutrition outcomes and if anything, supported a larger effect of the credit-only banks. By contrast in Honduras, participation in the combined credit and health programmes was strongly associated with reduced probability of diarrhoea in children and other health variables, but not in credit-only programmes. The *Credit with Education* programmes in Bolivia and Ghana, which used the weekly meetings of women belonging to the Credit Associations to provide nutrition education showed mixed results. However, evidence that improving the quality of nutrition education improves outcomes suggests there is a direct relationship between the education component and outcomes.

In Bangladesh, BRAC has long experience of combining the provision of credit and health and nutrition education, but very little is known about the importance of the education component (A. Bhuiya and A. Chowdhury, M.,R., 2007) relative to the credit component. In general, the lack of evidence with which to disentangle the different pathways linking microcredit and nutrition has made it difficult to assess whether nutrition improves solely as a result of better access to credit, or as a result of combining access to credit with nutrition services.

Most programmes to date involve the MFI directly providing both credit (loan and financial advice) and nutrition services. Very little is known about the effectiveness of programmes where the MFI promoted access to nutrition services by building direct linkages with health and nutrition services providers, instead of providing those services by itself. Direct provision of a range of services from credit to health and nutrition may be feasible for a large organisation with a diversified portfolio, such as BRAC in Bangladesh. For most smaller organisations, many of which are focused on microcredit services, adding a nutrition component to the programme may lead to inefficiencies in service provision. It is important therefore to explore ways in which MFI's can effectively partner with health and nutrition providers to exploit each other's comparative advantages.

### *Reaching the ultra poor*

Given the high concentration of malnutrition among the poor, microcredit programmes must be able to reach the poorest groups in the population in order to have a significant impact on improving nutrition. Microcredit is essentially formal financial services for the poor. Yet, the poorest groups in the population are often not reached by microcredit services. Even in Bangladesh where MFIs are known for their pro-poor focus, MFI concentration is highest among the second poorest quintile and lowest among the poorest quintile (H. Zaman, 2005). The poorest groups, which include landless, asset-less households without regular sources of income are less likely to have access to microcredit than others.

There are several factors underlying low rates of borrowing among the poorest groups. Given that a large proportion of microenterprise start-up's fail, there is a high perceived risk of failure among the poor which leads to self-exclusion from microcredit programmes, particularly when it involves borrowing for the first time. This is exacerbated by the fact that other women in the microcredit group may be unwilling to increase their own risk by guaranteeing the repayment of the borrower's loan. MFI's have also tended to deter first time borrowers and those who do not have any other income sources to repay the loan if they default. Finally, the poorest groups in the population often need a range of non-credit goods and services such as food, grants and guaranteed employment before they can make full use of the credit services offered to them.

One way to get round these constraints is to start with safety net programmes that will eventually help the poorest gain access to financial services (S. Hashemi and R. Raosenberg, 2006). The underlying premise of this approach is that the destitute build assets, savings and the confidence required to engage in sustainable economic activities *prior* to actually borrowing.

A good example in Bangladesh is the WFP-BRAC operated Income Generation for Vulnerable Groups Development (IGVGD) programme. IGVGD is built on an existing government safety net programme that provides free grain for eighteen months to destitute, female-headed households that are at the highest risk for hunger. A special BRAC unit organises the women into groups, collects savings, and equips them with skills such as vegetable gardening and poultry

farming. When the training is completed, the women also receive small loans to fund small-scale income generating activities. As a consequence, by the time the government transfer of free grain ends, the women are also skilled and capable managing credit. Successful graduates of the programme gain access to BRAC's regular microcredit programme. The IGVGD programme's results are impressive with nearly two-thirds of women "graduating" to become microcredit clients who have not slipped back into poverty requiring further relief assistance (Hashemi and Rosenberg, 2006).

The resources needed for this approach may be prohibitive, particularly for small MFI's. The MFI would need access to soft money in order to provide loans to safety net programme participants whose rate of default may be relatively high. Besides, having the same organisation provide social support on the one hand, and insist on repayment of loans on the other hand, may cause confusion among programme participants.

An alternative approach is for the safety net programme itself to develop basic financial services and training, and for the MFI to simply coordinate with the safety net programme to recruit successful graduates. CARE-Bangladesh's Rural Maintenance Programme (RMP), a public works programme that employs rural women who are heads of households and have no other source of income, follows this model. Every woman in the programme participates in a compulsory savings plan and are trained in basic arithmetic, gender equity and health and nutrition, as well as income generating skills. The programme also provides the women with information on local MFIs. RMP operates in 90 percent of rural districts in Bangladesh; about 40,000 women participate at any one time and about 10,000 complete the programme each year. 79 percent of graduates continue to be self-employed in microenterprise activities three years after the end of the programme cycle (Hashemi and Rosenberg, 2006).

Programmes similar to RMP and IGVGD have been attempted elsewhere but with less success<sup>6</sup>. The key is to have a separate professional agency implement the subsidised grant programme, and have the MFI focus on its core competency (Hashemi and Rosenberg, 2006). From the nutrition viewpoint, it is absolutely essential that linkages between safety net programmes and MFI's are established as it remains the most effective way to reach the poorest groups in the population, who also have the highest malnutrition rates.

#### ***4.5 Lessons learnt: ways to enhance the impact of microcredit programmes on nutrition outcomes***

- Three pathways of influence between microcredit and nutrition exist: the direct income effect, where greater access to credit is associated with higher incomes and reduced economic vulnerability, which translates into greater household food security; the women's empowerment effect, where greater access to credit for women is associated with a greater share of household resources being devoted to food and nutrition, and improved intra-household allocation of resources; and the direct effect of health and nutrition services provided in conjunction with microcredit.

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<sup>6</sup> The Central Region Infrastructure Maintenance Programme (CRIMP), a DFID-CARE-Malawi programme followed the RMP approach but was not as successful because it failed to bring MFIs into partnerships. The Towards Self-Employment Project (TSEP) organised by the Alexandria Business Association in Egypt was similar to IGVGD. Participants of this programme were slow to graduate, partly because using the same staff to provide credits and manage loans sent mixed signals to clients (Hashemi and Rosenberg, 2006).



- Both in Bangladesh and elsewhere, the evidence with regard to the impact of access to credit on incomes is ambiguous, but it is clear that it has significantly reduced consumption vulnerability and potentially, food insecurity. This is a particularly important effect in the context of Bangladesh where transitory food insecurity during periods of hunger is an important underlying cause of malnutrition.
- Microcredit has had a positive impact on women's empowerment in Bangladesh, by improving their income generating potential and, as a result, their status within the household and community. Women's borrowing in Bangladesh has been found to have a significantly greater positive impact on child nutrition than men's borrowing. This is attributable in part to women being empowered enough to have a greater say over household resource allocation decisions with regard to food and care for children.
- Strong rationale exist for providing nutrition and health services in conjunction with credit because improvements in income alone are not sufficient to improve nutrition. However, the evidence with regard to the effectiveness of these integrated programmes is not compelling.

There are strong interdependencies between the credit-led income effects, and the health/nutrition education effects. It is possible that the two effects are mediated by one another. For instance, if the income effect is weak and credit does not lead to substantial improvements in household food security, the positive impact of the health/nutrition education programmes may cancel out. Given the lack of evidence, it would be inadvisable to do away with the health/nutrition education components because of the potentially important role they play in communicating behaviour change messages to credit group members, who are both poor, nutritionally vulnerable and important agents of change in the household and community.

- The mechanism for providing the health/nutrition education services needs to be examined more carefully. Existing programmes largely involve the MFI taking responsibility for the provision of both credit and health/nutrition programmes. While this may be feasible for large NGOs with a diversified portfolio, in most cases, the integrated provision may undermine the efficiency with which microcredit services are provided. MFIs typically have little comparative advantage in providing non-financial services. A more efficient, but less well explored approach is for the MFI to establish strong linkages with existing health and nutrition service providers.
- Microcredit generally fails to reach the poorest groups in the population such as landless and asset-less households and those without any regular source of income. Given the high rates of malnutrition among these groups, the failure of microcredit to reach these groups is problematic. One solution, which has worked relatively well in Bangladesh to capture the poorest groups is to link safety nets with microcredit programmes. The beneficiaries of safety net programmes are given the skills and education to become entrepreneurs before graduating into potential microcredit clients.

## 4. Recommendations and conclusions

### *Multisectoral response to undernutrition*

#### **(1) Policy responses to malnutrition should not be dependent on intersectoral coordination.**

The evidence is clear that this approach is not realistic. The determinants of malnutrition are multisectoral, yet attempts to coordinate and implement cross-sectoral programmes to address malnutrition have proved largely unsuccessful. Multisectoral nutrition planning agencies have been stymied by the limited control they have over different sectors' resource allocation processes, while sectorally defined priorities have hindered collaboration between sectors. This begs the question whether the problem of malnutrition does indeed demand a complex multisectoral response. The existence and application of a national plan of action for nutrition, the institutional home for nutrition, and multiple sector involvement are often mentioned as important determinants for success or failure of nutrition interventions. Yet, an analysis of factors critical to the success of recent World Bank funded nutrition interventions showed that these three factors had no significant impact on the disbursement of funds for nutrition (C. Rokx, 2000).

#### **(2) A more realistic response is to 'plan multisectorally, implement sectorally'**<sup>7</sup>

Operationally, this involves identifying interventions within sectors that have the potential to significantly improve nutrition and mobilising resources specific to that sector. Two factors are critical for this strategy to work.

First, it is necessary to ensure that sector-specific stakeholders understand how their sector can contribute to alleviating malnutrition and to what extent the benefits outweigh any opportunity costs they face by committing sector-specific resources to nutrition. They should also have the capacity to do nutrition analysis. A multisectoral nutrition agency could still play a role, albeit limited, by guiding overall policy and resource allocations, and providing the right incentives and accountability framework to ensure that nutrition remains a priority. It should not however be responsible for implementing the nutrition programmes. Implementation should be the responsibility of sector specific agencies.

Second, it is necessary to ensure that alleviating malnutrition remains a high level policy priority. Political champions can play a critical role in this, as evident from the example of other countries where there has been a significant improvements in the importance given to nutrition in national policy (C. Rokx, 2000). Donor agencies should provide the right incentives for this approach through funding and capacity building for agencies in critical sectors. It is also important to be strategic with this approach as changes in government or donor agency leadership could result in nutrition being pushed to the backseat, if it is seen as too closely associated with the previous governing regime, which championed it (World Bank, 2007). Donor agencies can also provide critical guidance on technical matters, along with researchers based in national thinktanks.

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<sup>7</sup> Maxwell, S&T., C., "New Approaches to Planning," *Operations Evaluation Department Working Paper Series*. Washington D.C.: The World Bank, 2000.

**(3) Some agricultural and microcredit programmes are more suitable for integrating nutrition components than others.**

It is not feasible or cost-effective to incorporate nutrition components into all agricultural or microcredit programmes. In some instances, the costs of incorporating nutrition components may be prohibitively high relative to the benefits. Cost-effectiveness considerations were not examined in this study, nor was there enough evidence to do this. However, the agricultural interventions and microcredit programmes reviewed here do provide strong evidence of the types of programmes and interventions where adding nutrition components, particularly nutrition education, would help enhance the impact on nutrition outcomes.

**(4) In agriculture, the greatest potential for improving outcomes by integrating nutrition lies in the production of fruit, vegetables, livestock and aquaculture, particularly small-scale production at the household level.**

Including nutrition components to agricultural programmes relating to these products is cost-effective because they are high value from an agricultural production point of view, and high value nutritionally<sup>8</sup>. With staple crops however, technological interventions such as the introduction of modern inputs and improved crop varieties, and plant breeding already exist, which contribute to greater food security at the household level. For these crops, incorporating nutrition components has little value added to it.

In Bangladesh interventions to encourage the production of fruits, vegetables and animal source foods have proved to be effective in improving household food security and dietary diversity only when they are combined with efforts to provide nutrition education. Interventions to increase production alone cannot guarantee better nutritional outcomes if there is poor knowledge about caring and feeding practices. Nutrition education programmes, when designed to accurately reflect local needs and constraints, can help improve knowledge and practices.

**(5) In microcredit, the greatest potential for improving outcomes by integrating nutrition lies in targeting microcredit programmes that women are most likely to be involved in, and where there is a strong income effect.**

Nutrition education and related components will have greater impact when they are delivered to women, who are the most likely users of that information. Credit programmes that women are most likely to participate in include loans for small-scale household level activities, including agriculture.

There are strong interdependencies between the credit-led income effects, and the health/nutrition education effects. It is possible that the two effects are mediated by one another. For instance, if the income effect is weak and credit does not lead to substantial improvements in household food security, the positive impact of the health/nutrition education programmes may cancel out.

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<sup>8</sup> The authors are grateful to Lynn Brown for her comments on this.

**(6) Financing and implementing the nutrition component should be the responsibility of the health and nutrition sector, which has comparative advantage in this; the design of agriculture and microcredit programmes should ensure the nutrition components are integrated effectively.**

Since neither agricultural extension departments nor MFIs have significant comparative advantage in providing nutrition education, these agencies should not be expected to fund, design and implement nutrition education programmes. A better approach would be for the agricultural department or MFI to establish strong linkages with existing health and nutrition services to provide nutrition education in conjunction with their programmes. In Bangladesh, the community nutrition volunteers could play this role. In the spirit of planning multisectorally and acting sectorally, and in order to avoid potential conflicts with sector-specific funding priorities, the funding for nutrition education would come from the sector that is charged with providing nutrition services in general, such as the health sector in Bangladesh. A limited degree of overall coordination would be needed to establish these linkages, but the emphasis should be on exploiting sector-specific comparative advantages in service provision.

**(7) Empowerment of women should be emphasised in the design of agriculture interventions and microcredit programmes**

The evidence presented in this report shows quite clearly that agricultural interventions and microcredit programmes that empower women are likely to have a greater impact on nutrition. It is well known that when women are empowered enough to have a greater say in household resource allocation decisions, they are more likely to invest in the health and nutrition of household members and improve the intra-household distribution of food and care. However, efforts to empower women must take into account the local context with regard to the status of women and their control over land and capital.

**(8) Nutrition components of agriculture interventions and microcredit programmes should promote participatory learning to enhance women's empowerment**

Participatory learning about good nutritional practices, which allows women to share their experiences with the group, and discuss right or wrong practices and beliefs increases the likelihood of those messages being absorbed. In turn, this empowers women to be more assertive about putting into practice these lessons at home. Existing nutrition education programmes in Bangladesh do not place sufficient emphasis on participatory learning. Group learning sessions are didactic and rely almost exclusively on the community nutrition volunteers teaching the group.

**(9) To scale up successful nutrition components in agriculture or microcredit interventions, M&E capacity needs to be strengthened and greater attention paid to local-level needs and conditions**

As this review has shown, numerous, small-scale interventions exist that provide agriculture or microcredit services in conjunction with nutrition components and are associated with improvements in nutrition outcomes; but attempts to scale up these programmes have met with limited success. The household food security programme in Bangladesh is a good example of a successful small-scale intervention that failed to have much impact when it was scaled up to the national level. Underlying causes for failure of scaling up in general include a lack of M&E capacity, failure to take into account local needs and conditions, and larger institutional problems of cross-sectoral coordination.

**(10) The institutional capacity of GOB agencies to establish and manage effective M&E systems needs to be strengthened considerably.**

Strengthening institutional capacity to monitor and evaluate the scaling up of interventions is critical. It provides vital information on which aspects of the intervention are conducive to being scaled up, and which ones constrain it. M&E systems need to be established, which provide continuous feedback on the progress of interventions as they are being scaled up. However, the institutional capacity to establish and manage such a system is weak in most government agencies in Bangladesh at present. Ongoing efforts under HNPSP to strengthen M&E of the health, nutrition and population sector as a whole will be critical for scaling up nutritional components of agriculture and microcredit programmes as well.

**(11) Nutrition interventions should be integrated with combined microcredit and safety net programmes in order to ensure they reach the poorest of the poor**

The underlying determinants of malnutrition – lack of food security, inadequate caring and feeding practices, and poor health and living conditions – are highly correlated with poverty, making the poor the most vulnerable to malnutrition in Bangladesh and elsewhere. Their land and capital entitlements are virtually non-existent and labour entitlements not substantial enough to guarantee a regular source of income. This combined with a high perceived risk of being unable to repay the loans excludes these groups from most microcredit programmes.

Microcredit programmes can potentially reach the poorest of the poor by linking up with safety net programmes in efforts to improve beneficiaries' ability to manage loans and entrepreneurial skills. The first stage of the programme would involve a safety-net programme, which includes a nutrition component and training in credit management. In the second stage, the microcredit programme would recruit successful graduates from the safety net programmes for the provision of credit. Health and nutrition education is also provided to the beneficiaries as part of their developmental training. The IGVGD programme in Bangladesh is a good example of this.

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